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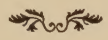

HUMAN NATURE

A FIRST BOOK IN PSYCHOLOGY

BY

MAX SCHOEN

Professor of Psychology
The Carnegie Institute of Technology

HARPER & BROTHERS PUBLISHERS
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1930

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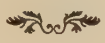
TO MY MOTHER



Man is the measure of all things,
of those which exist, and of those
which have no existence.

—PROTAGORAS

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Preface

SINCE this is a textbook and not a treatise I have resorted to numerous sources and authors, a good many of them outside the strict field of psychology. I have also quoted freely. My justification for such an unusual procedure is that whenever I wanted to say something that some one else had said far better than I could, there seemed to be no reason why I should spoil a good thing merely to satisfy foolish vanity to appear original.

The book has no axe to grind. It is neither structural nor behavioristic. It is both. It is built on the principle that life is an *activity*, and that mind and behavior are inseparable processes in the business of bringing about an adjustment between the organism and its environment. Behavior is stressed throughout, since it is in behavior that mind manifests its operations and through which mind is built up. There is no mind, or intelligence, where there is no behavior, and the behavior is the measure of the intelligence. Hence any psychology that overstresses or understresses either mind or behavior is a distortion of reality and a misrepresentation of life. The battle between structuralists and behaviorists is simply an echo of the historical quarrel of the philosophers regarding rationalism and empiricism, and just as John Dewey has been sounding the death knell of this old philosophical war horse with great effect, it is to be hoped that before long the last rites will be pronounced over its psychological offspring.

The material may be justly charged with being a mixture of biology, psychology, and philosophy, with a bit of sermonizing thrown in for good measure. I assume that the biology calls for no justification, since biology is the basic science of life. The philosophy I plead for on the ground that all significant knowledge is necessarily both scientific and philosophical. Science gives us one aspect of knowledge by telling us what a thing is, its nature; while philosophy gives the other aspect by telling us the meaning and significance of the facts of science in terms of human values. Even the investigator in the realms of pure physics and chemistry is now turning philosophical, an eminent example of which is Eddington's latest masterpiece, *The Nature of the Physical World;* while the philosopher goes to science for his data, like Whitehead in his great work, *Science and the Modern World*. But the psychologist seems to be afraid even to mention philosophy lest he be charged with being unscientific. The fear is so marked that he may be suspected of harboring an inferiority complex as to his scientific status. But of all the sciences, psychology has the most intimate philosophical implications, and I can see no sound reason why the human significance of psychology should be kept from the beginning student.

I also appeal for a sprinkling of sermonizing in which the facts of psychology are held up as a mirror to life in its daily business. The injunction, "Know thyself," as the virtue of virtues is as valid today as it was when first issued. And to point out to the student that psychology is the sole dependable guide to the consummation of this desirable end, can hardly be charged with being sanctimonious. My one hope is that the sermonizing is based upon sound philosophy, psychology,

and biology. It seems to me, furthermore, that a book dealing with human nature which does not tie up with the actually functioning human being, so that as the student reads along he is repeatedly prompted to exclaim, "Why, this is I!", is mostly worthless. All that a student carries away from such lifeless material is the boast or regret, "I have had psychology," which is similar to his saying that he has had the measles or the mumps. When a subject like psychology, purporting to deal with life as it is lived, is repeatedly voted by college students to be the most worthless subject in their curriculum, something must be radically wrong. And when psychology textbooks are heavy on theory and light on application, and particularly when the theory does not square with experience, the weak spot may lie, at least in part, in the fact that the textbook gives the student the feeling that the human being of psychology is an invention of the psychologists, some fantastic being outside the realm of his experience.

Friends and colleagues who have read the manuscript remarked that apparently I expected the psychology instructor to have intellectual interests other than academic psychology. I most assuredly do. I expect him to be interested in and to know life as it is and as it might be. Why a book intended to give a survey of human life should ignore such significant human interests as morality, religion, art, hardly mention the word philosophy, and refer to science only incidentally in order to convince the student that psychology is a science, without discussing the nature of science and its place in human life—in a word, sidetrack the whole life of the imagination—is a matter of wonderment, to say the least. If the psychology instructor has no interest in these matters, I would insist that he is most wondrously, if not blissfully,

ignorant, and is unsuited to serve as a guide for the young mind in the intricate world of human affairs and interests.

Most of my illustrations and applications are taken from the realms of music and art with which I am most acquainted. The instructor can substitute for these, or supplement them with, other material more within his own particular field of investigation.

I have also included brief discussions of the more common types of abnormal behavior. My object in thus departing from the prevailing textbook was to counteract the somewhat morbid attitude that the beginner assumes toward this branch of psychology.

My thanks are due to my colleagues, Professors Laurance F. Shaffer and Glen U. Cleeton, and to my friend Dr. Max Weinberg for many valuable suggestions and numerous corrections of detail. Dr. L. L. Thurstone of the University of Chicago has also kindly read the manuscript. For the learning exercises I am indebted to Drs. Shaffer and Simpson and to Professors Hazel Knight and G. U. Cleeton.

M. S.

PART ONE

What Human Nature Is, in General; Why and How It Is Studied; What Its Bodily Basis Is, and What Constitutes the Subject Matter of Psychology

¶In this section we shall be introduced to psychology. We shall attempt to find out what it is interested in, what it seeks to do as a science, what its methods of investigation are, what the scope of its subject-matter is, why it concerns itself with the structure and operation of the nervous system, and how the study of human nature is to proceed. Briefly, the purpose of this part of our book is to prepare ourselves for the adventure into the realm of human nature.

CHAPTER I

WHAT PSYCHOLOGY IS

Questions this chapter seeks to answer: How and why is Psychology abused and exploited? Why is Psychology a science, and what is its particular sphere among the sciences? What is the value and significance of Psychology as a science? What is involved in understanding human nature? Why do psychologists disagree?

PSYCHOLOGY began when the human mind first turned in upon itself and observed its own vari-colored landscape of ideas, images, desires, and thoughts. When for the first time man contemplated his past, speculated about his present state, and dreamed of future possibilities, psychology came into existence. But as a science psychology emerged from philosophy and established housekeeping under its own roof and in its own way only as recently as 1879, when Wilhelm Wundt established the first psychological laboratory at Leipzig. In this country G. Stanley Hall opened the first laboratory in 1883 at Johns Hopkins. The household has been blessed, and has prospered in this short time, until today its offspring are as numerous and varied as are the affairs of man. The progeny includes pure and applied psychology, normal and abnormal psychology, individual, social, and racial psychology, psychology of education, business, art, medicine, and religion, with psychoanalysis, behaviorism and

The rapid growth of psychology

mechanism as the youngest and most obstreperous members of the large household. Its neighbors, the established sciences, contemplate the antics of this boisterous family with amused, patient tolerance. But in the market place a horde of human buzzards and jackals, attracted by the exploitation possibilities of the prominent youthful science, shout their wares from the stalls and fatten their pockets at the expense of the gullible. In loud raucous voices, or soft persuasive tones, they invite the populous to invest quickly in ready-made, sure-cure panaceas for all varieties of human ills:

"Unlock the treasure-vaults of your mind—here are the keys."

Its exploitation

"Learn to control your material and spiritual destiny by tuning in with cosmic consciousness or the inexhaustible storehouse of cosmic supply."

"Are you the man or woman you ought to be? Beneath the self of which you are conscious there is hidden an unsuspected Self, a thing of sleeping strength and infinite possibilities. That Self is the man or woman you ought to be."

"Have you any ailments? Are you unhappy for any reason? Do you lack that charm and personality and force of character that attracts friends and holds them? If you are not up to par in your work and living, then there is something wrong. You were intended to be. You can be. If you are unhappy, disappointed or unsuccessful in your life, applied psychology will put you on the road to happiness and success."

"A startling discovery has been made about the mind. It enables you to quickly obtain *brilliant mental powers, great personal skill* and *spectacular ability* in any line you wish. You can do it with almost the same ease as you sharpen a

pencil! Some of the things this great discovery has done for men and women of all ages are truly astonishing. To bring salary increases of one or two thousand dollars a year—even to double or treble one's income—is nothing."

"These laws operate with scientific exactitude, and those who have succeeded in obtaining a working knowledge of them are enabled to break the bonds of environment, control elementary forces and utilize the potentialities of infinity."

And on the sidelines stands the intelligent layman, observing the feverish activity of the psychologist, the patronizing smile of his neighbors, the shouting of the quacks, and in his troubled and confused mind there arises the old question: But where is wisdom to be found in this bedlam of voices? Where is the place of understanding in this babel of claims?

I

What Psychology Is

But psychology is a science

Every science selects some particular aspect of nature for its sphere and sets itself to the task of answering the four questions presented by any natural phenomenon: What is this? How does it behave? Whence came this? How did it come to be as it is?[1] Science is the method for obtaining verifiable and communicable facts about nature by impersonal observation, experiment, registration, and measurement, and for the presentation of these facts "as precisely as possible, as simply as possible, as completely as possible, and as consistently as possible."[2] The material sciences seek to dis-

[1] Thomson, J. A., *Science and Religion,* Scribner's, 1925, chap. i.
[2] Thomson, J. A., *The System of Animate Nature,* Holt, 1920, pp. 43-44.

cover these facts for the world of inanimate nature; the organic sciences, for the world of animate nature.

Psychology is a member of the general science of biology, which deals with the study of animal life, including man. Now a living organism is an animate machine, and every machine *is* something and *does* something. That is, an animal has a structure of parts, and these parts function, or perform a certain work, in a certain way. Consequently, two of the biological sciences are anatomy, or the science of structural analysis, and physiology, or the science of functional analysis.

It is a branch of biology

But here the analogy between the living and the non-living machine ceases. When we have made an inventory of the parts of a non-living machine and have determined the work performed by each separate part and by the interaction of the parts, nothing else remains for investigation. The analysis of the animal machine, however, into structure and function, is but a stepping-stone and an invitation to a study of the most fascinating and significant aspects of its life, namely, its behavior, or what some would call its mind. An animal learns, loves, hates, fights, nourishes and protects its young, remembers, forgets, does one thing under one set of conditions, and quite something else under other conditions. These phases of its existence seem to be more its very life, the core of its being, than are its physiological processes. And mind, which is but the all-inclusive name for these extra-physiological phenomena, does not seem to be altogether reducible to physiological functions. Such things as a human hope, an experience of beauty, or love, appear to be matters entirely different from such physiological processes as heart beat, digestion and other bodily performances.

Psychology as a science has for its special province the

study of those manifestations of the human machine that seem to lie above and beyond anatomical parts and physiological functionings, and to which we refer as human nature. Psychology is then the third member of the triumvirate of biology, which together aim to give a rounded-out picture of what the human organism is and does.

Its interest is human nature

II

The Fruits of Psychology

The immediate objective of psychology, as that of any other science, is to get at the facts in the case regardless of consequences or applications. But the tree of knowledge is nevertheless known by its fruits, and may be said to exist for its fruits. Man is not made for knowledge, but knowledge came into existence to serve man. The search for knowledge for its own sake, if there is such a thing, must be a late acquirement of civilization. Certainly at the dawn of the human mind no one arose with the suggestion that knowledge would be a valuable thing to possess for its own sake. Knowledge springs out of life as a necessity and not as a by-product or ornament. Life functions through its environment, and the greater the knowledge of that environment the fuller does life become. There is a feeling of discomfort, uneasiness, almost fear, in the presence of the strange and unfamiliar. When a person finds himself in the company of a stranger he will proceed cautiously as to topics of conversation, usually opening the attack with some safe topic like the weather. Only after a degree of familiarity has been attained, which means, in other words, that a certain amount of knowledge has been acquired, does he feel free and at

Knowledge is not a luxury but a necessity

ease in a situation. He begins to feel at home and to act freely in the presence of a stranger when he has found out something about the stranger's occupation, interests, likes, and dislikes. He may even attempt, after this knowledge has been acquired, to bring him to his own point of view about certain matters, that is, to control his behavior. Ancient mythology and magic, the forerunners of modern science, are illustrations of the fundamental necessity to know as a means of control. Thunder evoked fear. Thunder closely resembled the roar of an infuriated animal. A man roars when he is angry. Hence thunder is the roar of anger of a displeased superman, a god. This knowledge offered a key to the control of the gods. When a man is angry he can be pacified, that is, controlled, by offers of gifts. Thus when the gods manifest their anger they may be appeased by offerings and sacrifices.

Knowledge is control

The history of science as a whole is the story of man seeking to establish an *entente cordiale* between himself and the world in which, and by means of which, he functions. Life urged him to seek knowledge in order to be comfortable in his natural surroundings, and drove him to use his knowledge to control nature for his greater comfort. Knowledge is power because it gives foresight, and foresight gives control because it makes possible prediction.

In the field of psychology this control is made possible by a knowledge of human nature. Although a study of psychology will not enable one to draw blood from a turnip with a magic wave of the hand, the results of such a study have a very practical significance. All human strife, conflict and clash are due either to a lack of knowledge of the facts of human nature or to a misinterpretation of the facts involved in a situation. There is, and there can be, no room

for disagreement when true facts are known. If we knew, for instance, what heredity is and how it worked, we would not have those who exaggerate its importance and those who disregard it. If we knew what religion really is we would not have fundamentalists and modernists exchanging compliments. If we were willing to accept the truth we would not have evolutionists and anti-evolutionists. In the realm of mind, the condition conducive to peace and progress is brought about in one of two ways: either we know the facts and follow them, or we admit we do not know and proceed to find out. Plato divided knowledge into science, which is complete knowledge, at one end of the scale, ignorance at the other extreme, and opinion between the two. Now it is only in the sphere of opinion, which ever fluctuates between knowledge and ignorance, that destructive disagreement is possible.

Knowledge of human nature means control of human problems

Let us look to psychology for an illustration of this principle. Three persons, X, Y, and Z, are listening to two bells placed at a distance of one mile from each other, which can be sounded simultaneously. Y is located at a point midway between the two sources of sound, and X and Z stand to right and left of Y, half way between him and one of the bells. When the bells are sounded, what will the three persons hear? Y, who is centrally located, will report hearing both bells simultaneously. X, who is close to the bell on the left, will declare that the left bell was sounded first. Z, who is close to the bell on the right, will state just the opposite of X. Now imagine these three persons engaging in an argument about their varied experiences and the consequences of such an encounter. But if they consider not only their own experiences but also the *actual facts* in the case, which include their

location or point of view, they will reach a common ground of understanding, and will conclude that it was not the objective phenomenon which varied but rather their individual interpretation or opinion of it. The tree of psychology sends its roots deep into the subsoil of the affairs of men, and it is by eating of the fruit of the tree that men learn to judge human experiences tolerantly and with open minds. Psychology is a scientific investigation of human nature for the sake of its intelligent control through understanding.

III

THE UNDERSTANDING OF HUMAN NATURE

In his dialogue, *The Lesser Hippias*, Plato raises an issue which sets before us in a clear and practical manner just what is involved specifically in an understanding of human nature. The dialogue consists of a discussion as to who is a better man, he who knows what is right but does wrong, or he whose wrong-doing is due to ignorance. The "common-sense" answer is given by Hippias, a member of the discussion group, who holds that allowances must be made for involuntary wrong-doing, but that for deliberate wrong-doing there is no excuse. Socrates, who serves as Plato's mouthpiece, refutes this point of view by raising another question, namely, whether such a thing as voluntary wrong-doing is possible, and answering it in the negative. All evil doing, he maintains is involuntary, due to ignorance, since it is inconceivable that any person would deliberately choose to do that which he knows to be bad for him. Many men do what is bad for them, but they do it not because they know that it is bad, but because they think it is good. In

Psychology seeks knowledge about human nature by studying mind in terms of behavior

this issue we have in crystallized form the central problem of psychology, the answer to which constitutes an understanding of human nature. There is a subjective phase to human nature in the form of thoughts, feelings, and desires which constitute the inner world of *mind*, and there is an objective phase, the outer world of *behavior*. What is the relationship between them? When the three observers quarrel about the bells, when we fight and squabble about religion or art or morality, what is the source, the background of our behavior? What is there in the statement, "I knew better, but I did not follow my best light?" Is there really such a thing as a deliberate liar, hypocrite, or evil-doer? When the psychiatrist or psychoanalyst considers an abnormal act merely as a symptom of a mental ailment, is he chasing rainbows or following a sound procedure? Society insists, and must insist in order to insure its stability, that every one of its members shall conduct himself in a specified manner. But in case of an infringement of the group law, does not justice to the individual demand that an attempt be made to look beyond the effect to the cause, beyond the behavior to the mental state that is behind it? Where the cause is unknown the effect is beyond control. The psychiatrist modifies the behavior of his patient by discovering the cause of which the behavior is the effect. If psychology limited itself to a study of behavior alone, it could do nothing more than catalogue facts, without knowing their causes and the laws that govern them. Without a knowledge of causes the results cannot be understood, which means they cannot be controlled. The chemist controls chemical compounds, can make and unmake them, because he knows not only the elements that compose them, but also the laws of their composition. He knows not only what he

has, but also how it came to be what it is. To understand human nature, psychology must penetrate beyond the facts of behavior into the realm of mind, of which behavior is the outward expression. We know, of course, that where there is no behavior, there is no mind, and that therefore mind is but an inference from behavior. But so is any scientific law but an inference from observable facts. And it is the law that science is after in its attempt to learn how to control the facts. Science studies laws in terms of facts, seeks to discover causes by observing their effects. Chemistry is the study of atomic laws as they reveal themselves by the structure of the varieties of matter. A chemical compound is understood when the atomic law that it exemplifies is known. Likewise human nature is understood, becomes controllable, when the mental laws that operate in behavior become established. Psychology is therefore an attempt to understand human nature by a study of mind in terms of behavior.

IV

THE DIVISION AMONG PSYCHOLOGISTS

Our definition of psychology as the investigation of mind through behavior, calls for a discussion of the battle of the psychologists, another source of confusion and puzzlement to the intelligent layman. Psychologists are divided into four more or less opposing camps, the point at issue between them being as to what constitutes the proper approach and subject matter for the study of human nature. We shall study

The Mentalist

mind, its structure or content, and its operations or functions, says the Mentalists. Mind is the one true reality, since it leads

to and is the source of all behavior. If I know mind I know behavior, as I know effect from cause.

Mind, consciousness, is a phantom, a will-o'-the-wisp, an inference, a shadow, an assumption, say the Behaviorists. A science must limit itself to observable, measurable phenomena, or it degenerates into empty speculation. The only observable phase of human nature is behavior, muscular and glandular activity, and psychology must limit itself to this phase if it is to be a science.

The Behaviorist

Whether we study mind or behavior, says the Mechanist, we should attempt to penetrate beneath both in order to find the basic nature of what we are studying. What is behind a thought or an act? Is the mind a self-subsistent entity or is it the product of something, as smoke is a product of a burning substance? Can the affairs of man, his hopes, wishes, acts, strivings, be explained in the same manner that the operation of a machine is to be accounted for? Certain caterpillars, on being liberated from the cocoon, crawl up the branches of trees, eat the green leaves at the tip, and, having eaten, crawl down again. They behave thus, contends the Mechanist, not because of any knowledge that green leaves are to be found at the tips of trees, but simply because they are drawn upward by light when empty, and downward by gravitation when full. An empty caterpillar is simply a different chemical compound from a stuffed caterpillar, and its movements are governed by physico-chemical laws, as are those of any machine. Does the same condition hold for human beings, on a more complicated scale? Are our likes and dislikes, our changing attitudes and inclinations, determined for us by our bodily processes? According to Jacques Loeb, the chief of Mechanists:

The Mechanist

Nobody doubts that the durable chemical elements are only the product of blind forces. There is no reason for conceiving otherwise the durable systems in living nature. . . . Our wishes and hopes, disappointments and sufferings have their source in instincts which are comparable with the light instincts of heliotropic animals. . . . For some of these instincts the chemical basis is at least sufficiently indicated to arouse the hope that their analysis from the mechanistic point of view is only a question of time. We eat, drink and reproduce, not because mankind has reached an agreement that this is desirable, but because, machine-like, we are compelled to do so. We are active because we are compelled to be so by processes in our central nervous system; and so long as human beings are not economic slaves, the instinct of successful work, or workmanship, determine the direction of their action. . . . Not only is the mechanistic conception of life compatible with ethics: it seems to be the only conception of life which can lead to an understanding of the source of ethics.[1]

The Psychoanalyst

The Psychoanalyst adds a fourth voice to the chorus of psychology by insisting that the Mentalist, with whom he is most closely affiliated by his interests, scratches but the surface of the mind. He maintains that beneath the superlayer of conscious mental activity there lie ideas, or past experiences, of which the person is unaware, but which not only outnumber the conscious ideas but also outrank them in significance. It is these subconscious ideas which influence, if they do not completely control, our conscious existence.

The reader who is not easily taken in by surface indications, and who makes allowances for the natural enthusiasm of the pioneer for his mental offspring, will have little difficulty in noticing that these points of view supplement rather than contradict one another. The manifestations of human nature

[1] DUFFUS, R. L., *Jacques Loeb, Mechanist*, Century, vol. cviii, pp. 374-383.

are as complex and varied as are the rays of the spectrum. But behind the variety there is unity, and the investigation of each particular manifestation leads to a better understanding of the whole. That the Psychoanalyst and Mechanist supplement the Mentalist is quite apparent, the former by expanding the mental horizon, and the latter by delving into its material bases. It is the Behaviorist who insists on his self-sufficiency and thereby creates confusion. When the Behaviorist claims that only his approach is scientific, one is led to doubt the soundness of his conception of science. It is true that science limits itself to the study of particular, observable phenomena. But a human thought is no more an abstraction, an assumption, a will-o'-the-wisp, than is any other natural occurrence. A thought is an observable phenomenon, as observable by him who has it as any other natural fact. The Behaviorist protests that the sole evidence for the existence of consciousness or mental processes is the statement of the individual who claims to have them. But the same objection holds for any experience. The sole evidence for the existence of a phenomenon or object is the consensus of reports given by a sufficiently large number of normal observers. I say, "I see a tree." How do I know that I am right? I know because any number of normally constituted persons would give a like report in the presence of the same stimulus. The existence of an object is an inference drawn from the common experiences of normally constituted human beings.[1] Now all persons report in no uncertain terms the possession of mental processes, and these mental processes are to many more vivid and real than are their overt acts.

The four schools are supplementary

[1] Russell, Bertrand, *The Analysis of Mind,* Allen and Unwin, 1921, chaps. v, vi.

Mental phenomena are, therefore, perfectly legitimate material for scientific investigation. Science aims at drawing general inferences, or abstract laws, based upon systematic observation of particular occurrences which are in themselves, however, but inferences. When the Behaviorist, therefore, maintains that mind is but an inference, the answer to his objection is that the same is true of all the subject matter of science. Science begins with inferences and proceeds to inferences. Its data are inferences, and so are its conclusions; the one set is what we term concrete and the other abstract, and the concrete set is used as an avenue of approach to the abstract set. In psychology there are also these two sets of inferences, behavior and mental process. A science studies the abstract in terms of the concrete. Psychology likewise studies mind in terms of behavior.

CHAPTER II

HOW PSYCHOLOGISTS WORK

Questions this chapter seeks to answer: How does the psychologist obtain data on human nature? How does he use the methods available to him? What kinds of problems lend themselves to one method of investigation? Can the methods be used together on a single problem? What is the extent of the field of psychology?

IN SEEKING light on some psychological problem the psychologist has recourse to several methods, choosing from among them in accordance with the nature of his problem and the kind of data he desires. He may also use one method as a check-up on the data obtained by another method, while often the nature of the problem is such that he can take advantage of more than one method in the same investigation. The most important of the methods are *introspection, observation, psycho-physical measurement and group experimentation.* We shall understand best what these methods mean and how they are used by giving the results of three investigations, one for each method.

Psychology uses several methods of investigation

I

THE METHOD OF INTROSPECTION

Problem.

Introspection

What is the effect of a musical composition on the mood of the listener, and to what degree does a musical selection induce a uniform mood in an audience?

Material and Subjects.

The music material consisted of the following selections:

Humoresque, violin
May Is Here, orchestra
Evening Star, cello
Berceuse, cello
Ase's Tod, band
Funeral March, violin
Aïda March, orchestra
Ave Maria, violin
Kamennoi-Ostrow, orchestra
Liebesfreud, violin
Pastel-Minuet, instrumental trio
Anitra's Dance, instrumental trio
Shepherd's Dance, orchestra
Light Cavalry Overture, band
William Tell Overture, band

These selections were grouped into the following two classes according to probable mood effects:

1. Joyful
   Liebesfreud
   Pastel-Minuet

Anitra's Dance
Shepherd's Dance
Aïda March
Light Cavalry Overture
William Tell Overture

2. Serious
May Is Here
Humoresque
Evening Star
Berceuse
Ave Maria
Kamennoi-Ostrow
Ase's Tod
Funeral March

The subjects were seventeen men and women. In a personal interview with each of the seventeen persons an estimate was formed of their relative degree of musicalness, and a questionnaire gave information about their musical training, experience, musical likes, dislikes, and attitude toward music as a whole.

Procedure.

Following the interview and the filling out of the questionnaire, each observer listened to the musical selections in the following order:

1st Session—Ave Maria, Pastel-Minuet, William Tell Overture, Humoresque
2nd Session—Light Cavalry Overture, Evening Star, Liebesfreud
3rd Session—Kamennoi-Ostrow, Funeral March

4th Session—May Is Here, Berceuse, Aïda March
5th Session—Anitra's Dance, Ase's Tod, Shepherd's Dance

Each listener was given a form like the following on which his reactions to every selection were recorded.

1. State below, as definitely as you can, your general state of being at the present moment, physical and mental, particularly the mood you are in. For example, "I am tired, and feel somewhat depressed, feel like taking a walk or a chat with a friend, need some relaxation, etc." .....
.....
.....
2. Do you enjoy the mood you are in at present, or are you eager to change it, or are you indifferent? .....
.....
3. If eager to change the present mood, what kind of mood would you rather be in? Comment freely. .....
.....
.....
4. You will now hear a piece of music. Put yourself in the same attitude you would adopt at a concert or, in other words, free your mind of everything and give yourself up entirely to the music. You have absolutely nothing to do now but listen. Do not read what follows.
5. Now do what you did at the very beginning, namely, comment in full on your present mood and state of being. Do not put down anything because you think it will sound nice, but give as accurate a picture of yourself at the present moment as you possibly can. .....
.....
.....
6. Below are four numbers. Underscore one of them to indicate the degree of your enjoyment of the music you just heard. oo

means you were irritated by the music, 0 means no effect, 2 enjoyed slightly, 4 moderately, 6 greatly.

00 0 2 4 6

7. Do you judge the selection you just heard as being good or poor music, irrespective of the enjoyment you got from it? Underscore your judgment below.

Very poor, poor, fair, good, very good.

8. What kind of music would you like to hear now, in preference to any other kind? Describe it as well as you can. .....

.....

.....

9. Indicate below your familiarity with the selection you just heard.

New, slightly familiar, familiar, very familiar.

Give the name of the selection if you can. .....

Conclusions.

Mood Change.—Chart I gives the effect of each selection as reported by each observer, indicating whether the music produced or failed to produce a change in the existing mood. The plus sign signifies a change; the minus sign, no effect. The latter means that the music failed to arouse in the observer a reaction of sufficient intensity to make him conscious either of a change of mood or of an intensification of the existing mood. The figures adjacent to the plus and minus signs indicate the degree of enjoyment for each selection for each observer, 6 indicating maximum enjoyment.

The occurrence of no effect (0) is so rare as to be negligible for practical purposes; while from the statements of those reporting 00, it is evident that the irritation was due, in the majority of cases, to manner of interpretation (playing out of tune, grating, poor tonal quality, dragging, etc.), and in the

CHART I

SHOWING THE EFFECTS OF MUSIC ON EXISTING MOODS

Selections	Observers																
	W.B.	D.C.	R.D.	E.D.	E.H.	G.M.	P.M.	G.I.	R.K.	N.K.	L.M.	M.M.	L.P.	F.R.	I.W.	M.L.	M.W.
Humoresque	+∞		+2	+4	+6	+2	+6	+6	+6	−0	+4	+6	+∞		+2	+∞	
May Is Here			+6		+6		+6		+6	+∞		+4		−0	+4		
Evening Star	+4		+6	+4	+4	+4	+6		+6	+4	+∞	+6	+4	+6	+∞		
Berceuse			+6		+2		+6			+4		+6		+6	+6		
Ase's Tod			+6	+4			+6		+4	+6		+2		+6	+6		
Funeral March	+6		+6	+4	+∞	+6	+6		+4	+6		−0	+2	+2	+2		
Ave Maria	+6	+4	+6	+4	+4	+6	+4	+4	+6	+4	+∞	+2		+∞	+6	+6	+6
Kamennoi-Ostrow	+4		+6	+∞	+∞	+6	+6		+6	+6		+6	+∞	+4	+4		
Liebesfreud	+6		+6	+6	+6	+6	+4		+6	+4	−0	+6	+2	+6	+4		
Pastel-Minuet	+6	+2	+4	+4	+4	+6	+6	+4	+4	+4		+2	+4	+4	+6	+6	+4
Anitra's Dance			+6	+4			+6		+4	+6		+4		+2	+4		
Shepherd Dance			+6	+6			+6		+6	+6		+6		+4	+6		
Aïda March			+6		+4		+6		+6	+4		+4		+4	+∞		
Light Cavalry Overture	+∞		+6	+2	+6	+4	+6		+6	+∞	+2	+6	+2	+6	+∞		
Tell Overture	+6		+4	+4	+6	+6	+6	+6	+6	+6	+∞	−0	+∞		+∞	+6	

CHART II

Selections	Existing Moods					Mood Effects				
	Joyful	Composed	Nervous	Dreamy	Sad	Joyful	Composed	Nervous	Dreamy	Sad
Liebesfreud	1	1	4	2	4	8			3	1
Pastel-Minuet	1	5	6	2	3	13	3			1
Anitra's Dance	3	1	3		1	7	1			
Shepherd's Dance	4	2	2		1	8	1			
Aida March	3	2	3			4	1	2	1	
Light Cavalry	8		3	1	1	12		1		
Tell Overture	10	1	1	1		10		2	1	
May Is Here	1	3	4		1	3	2	2	2	
Humoresque	8		5			2		5	6	
Evening Star	10	2	1					1	6	6
Berceuse	4	1	2	1		1			5	2
Ave Maria	2	1	10		4		2	1	9	5
Kamennoi-Ostrow	2	1	2		7	1	2	3	5	1
Ase's Tod	5	1	2						2	6
Funeral March	3	2	6		1	1		1	1	8

rest of the cases to a dislike for a particular type of music, instrument, or instrumental combinations. Thus, for instance, the "Humoresque" annoyed most of the listeners because the recording was very badly out of tune, the most musical of the observers stating this specifically, while many stated that there was something wrong with the selection. Again, in the case of "Kamennoi-Ostrow," the rendition was dragged out and the composition mutilated by omissions, the observers reporting the first item specifically, and the second by vaguer statements of there being something wrong with the piece. In the "Light Cavalry Overture" the irritation was produced by the unpleasant quality of the instruments, the trombones in particular emitting ear-splitting tones. The "Evening Star," another selection resulting in many oo's, is given a very unmusical interpretation, although played by one of the foremost cellists of the day.

Eliminating, then, the few cases of no effect as irrelevant in the present case, the chart indicates definitely that the selections used in this study produced a change of mood in every instance in the seventeen listeners, or intensified an existing mood when in conformity with the mood of the music, both effects giving some degree of enjoyment.

Uniformity of Mood Effect.—The power of music to change an existing mood is perhaps neither as interesting nor as significant as the degree of uniformity of mood induced by the same selection in all hearers. In Chart II the mood distribution of the listeners before and after hearing the music is shown. The moods included under each key word are the same for this chart as for Chart I.

Of the moods before the music for the seven selections

in Class I (joyful), thirty are in agreement with the music, while fifty-four are in moods contrary to that of the music. Of the moods after the music for the same group of selection, sixty-two are in moods similar to that of the music and sixteen in moods different from that of the music. Of these sixteen contrary moods, we note that three report irritation which, as previously mentioned, is due not to the music so much as to the manner of rendition. (Wherever a discrepancy occurs in the number of moods before and after the music, it is due to the failure of some of the observers to report the effect of some of the selections.) Of the seventy-two moods before the music for the *calm-restful, dreamy-pensive* classes of selections, nine are in agreement with the music, and sixty-three different; while of the seventy-two induced moods, thirty-nine fall under the moods inherent in the music. Of the remaining thirty-three, fourteen report irritation and nervousness, due to rendition or dislike for a type of music, and fourteen fall under the sad class, a mood which few persons could differentiate from the *dreamy-pensive* class. Of the twenty pre-audition moods for the depressed-sad class of music, one agrees with the music and nineteen are contrary; while of the nineteen post-audition moods, fourteen agree with the music, one reports nervousness and three belong in the *dreamy-pensive* class.

Summarizing the data from Charts I and II, we conclude not only that the variety of selections used in this investigation produced a change of mood in practically all the listeners, but also that the moods induced by each selection, or the same class of selections, as reported by the large majority of the hearers, were strikingly similar in type.

II

THE METHOD OF OBSERVATION

Problem.

Can animals like chimpanzees learn by understanding or insight, or can they learn only by chance?

Material and Subjects.

Observation

Chimpanzees wandering about in a playground inclosed by walls on three sides and crossbars on the fourth. Fruit scattered inside and outside the inclosure but beyond direct reach of the animals' hands or feet. Sticks, stones, and boxes are scattered about the enclosure and ropes fastened to the walls. By these means the experimenter provided "a situation in which the direct way to a goal is barred, but in which an indirect way is left open. The animal is introduced into this situation, which has been so planned that it is *fully comprehensible*. The animal is then left to indicate by its behavior whether or not it can solve the problem by the indirect means that have been provided." [1]

Observations.

Seventeen experiments were conducted, two of which were as follows:

Experiment 1.—A basket containing fruit hangs from the top of the animals' cage about two meters above the floor. The free end of a cord that holds the basket is looped over a branch of a tree in the cage. If the loop is removed the basket drops to the floor. The following behavior of Sultan, one of the chimpanzees, was observed:

[1] KOFFKA, K., *The Growth of the Mind,* Harcourt, Brace & Co., 1924, p. 181.

After a while—the animal being very restless, as he was in all similar situations, particularly upon finding himself in unwonted isolation—Sultan suddenly went to the tree, climbed up to where the cord hung, and remained quiet a moment. Then, while glancing at the basket, he pulled the cord until the basket was drawn up to the ring at the top of the cage. He then let the cord loose and drew it up again, this time more forcibly, so that the basket tipped when it struck the wires above and a banana fell out. He climbed down, took the fruit, climbed up and again began to pull at the basket, but this time he pulled so powerfully that the rope broke, and the basket fell to the ground. Coming down immediately, he took both basket and fruit, and carried them off.[1]

Experiment 2.—The food hung from the roof of the cage. In a corner of the cage was a box high enough to reach the food if placed directly under it. Koko, the youngest ape in the collection, was used in this experiment:

He jumped upwards several times to begin with, perpendicularly beneath the objective, then took his rope in his hand, and tried to lasso the prize with a loop of it, could not reach so far, and then turned away from the wall, after a variety of such actions, but without noticing the box. He appeared to have given up his efforts, but always returned to them from time to time. After some time, on turning away from the wall, his eye fell on the box: he approached it, *looked straight toward the objective,* and gave the box a slight push, which did not, however, move it; his movements had grown much slower; he left the box standing, took a few paces away from it, but at once returned, and pushed it again and *again with eyes on the objective,* but quite gently, and not as though he really intended to alter its position. He turned away again, turned back at once, and gave the box a third tentative shove, after which he again moved slowly about. The box had now been moved ten centimetres in the direction of the fruit. The objective was rendered more

[1] *Ibid.,* p. 183.

tempting by the addition of a piece of orange (the *non plus ultra* of delight!), and in a few seconds Koko was once more at the box, seized it, dragged it in one movement almost up to a point directly beneath the objective (that is, for a distance of at least three metres), mounted it, and tore down the fruit. A bare quarter of an hour had elapsed since the beginning of the test. Of course, the observer had not interfered with either the ape or the box, when he "improved" the objective. The improvement of the objective by the addition of further items is a method which can be employed over and over again with success when the animal is obviously quite near to a solution, but, in the case of a lengthy experiment, there is the risk that fatigue will intervene and spoil the result. It must not be supposed that before the exhibition of the orange, the animal is too lazy to attain its objective; on the contrary, from the beginning, Koko showed a lively interest in the fruit, but none—at first—in the box, and when he began to move the latter, he did not appear apathetic but uncertain; there is only one (colloquial) expression that really fits his behavior at that juncture: "It's beginning to dawn on him!"

There are other definite proofs that the animal did not hesitate out of pure laziness to employ a method that he would have understood quite well. For instance: the test was repeated after an interval of a few minutes; the objective this time was fastened to the same wall but on the other side of the fastening which held Koko's rope to the wall, and more than three metres from its former position; the box was left untouched, standing just under the former site of the objective, where Koko had himself dragged it. He sprang at the new objective, in the same manner as before, but with somewhat less eagerness; at first he ignored the box. After a time he suddenly approached it, seized and dragged it the greater part of the distance toward the new objective, but at a distance of a quarter of a metre he stopped, gazed at the objective, and stood as if quite puzzled and confused. And now began a tale of woe for both Koko and

the box. When he again set himself in motion, it was with every sign of rage, as he knocked the box this way and that, but came no nearer to the objective. After waiting a little the experiment was broken off, so that the box should not be knocked unintentionally in the direction of the fruit, and thus afford a solution by pure chance.

The next day the box was again ignored although Koko was much exercised to reach the objective, and tried the most varied implements, among others the aforementioned old shoe, in lieu of a stick. Occasionally he laid hold of the box, but it was not evident that he had the objective in view as he did so. Two days later, the scene was changed, the fruit being fastened to another of the walls, and the box placed four metres away from it. The animal used every means—except the box—but could not reach the prize. After one of these vain attempts, on turning away, the box caught his eye, and he looked fixedly at it, so that the observer momentarily expected him to fetch it. But Koko looked away again, and then tried a new method which is described below. As that too was unsuccessful, he sat down, exhausted, on the box and presently began to hop about playfully, still seated on the box. In the course of the next test, two days later, it became increasingly evident that the solution had gone from his recollection. In this experiment, two boxes were placed about five metres from the objective. Koko eyed them suspiciously from time to time, but did not fetch them, keeping to other methods of procedure. Finally, while covering Koko's eyes with our hands, we placed one of the boxes so close to the wall that—as he forthwith demonstrated—he had only to stand on it to touch the wall immediately under the objective with his hand. Therefore, if the box were pushed a very little farther, the thing was done. Koko stretched and strained himself as he stood on the box, but he did not give the slight propulsion that was alone necessary. The next day he was allowed to play with the box for a short time; among his movements we noticed the following: throwing over the box, hopping on it, and sitting in it. Five days later, on the

occasion of the next experiment, Koko used anything and everything he could lay hand on as a substitute for the familiar stick; the box he merely frequently stared at in a peculiar manner. Suddenly he flew at it and began a violent attack; he was beside himself with rage, flung the box to and fro, and kicked it. These outbreaks which had been rarer on previous days and were considered the result of accumulated ill-humour, were now concentrated entirely on the box. Again and again as he turned from the objective, his eyes sought the box; he glared, and then fell upon it.

After an interval of nine days, the experiment was continued. In the intervening period Koko was not shown the box at all. The objective was hung on the wall as before, and the box placed two metres away from it (diagonally). Koko stretched towards the prize for a while in vain; he turned away, saw the box, and stared at it for a moment. He went up to it and seized it; for a minute it looked as though he was about to attack it again; but instead, he dragged it hurriedly beneath the objective, mounted it and pulled down the fruit. The place in which this test was completed was not the scene of the first experiment, and between the two dates there was an interval of nineteen days, during the first half of which no trace of a solution appeared, except an equivalent of the words: "there's something about that box."

After this Koko did not lose mastery of the solution, although in the two repetitions of the test which immediately followed his success, he at first stretched up and leapt towards the fruit; but the box was presently brought up after all. In the second repetition Koko had set down the box too far from the objective in his haste, so could not reach the prize when standing on the box. He got down at once and pushed the implement into the right position. The initial distance between objective and box did not seem to exert any influence, the box being carried for six metres as quickly as for two. The following day Koko began to turn towards the box and seize it as soon as anyone came in sight carrying edibles. Not seldom he picked up a stick too and carried it

After Köhler

PLATE I.

One of Köhler's Apes Piling Up Boxes.

with him; he either threw the stick away as he mounted the box, or on other occasions hooked the fruit off the nail with it. Such a conglomeration of methods was observed in other chimpanzees too: sometimes they were ingenious and, in fact, the only practicable means to the desired end.[1]

Conclusions.

From all his observations the experimenter, Köhler, concludes:

Chimpanzees manifest intelligent behaviour of the general kind familiar in human beings. Not all their intelligent acts are externally similar to human acts, but under well-chosen experimental conditions, the type of intelligent conduct can always be traced. This applies in spite of very important differences between one animal and another, even to the least gifted specimens of the species that have been observed here, and, therefore, must hold good of every member of the species, as long as it is not mentally deficient, in the pathological sense of the word.

III

The Method of Psycho-physical Measurement

Psycho-physical measurement

Problem.

Songs are never sung or intended to be sung exactly as written. Even the most mechanical popular tune is rendered differently by each individual, the difference lying mainly in the duration of the elements, in the stress assigned to them, and above all in the attack by the voice and the utterance of each sound. In artistic performance all these sources of variation are employed, mainly unconsciously, to express the thought or emotion of the singer.

The purpose of this study was to obtain scientific data on

[1] Köhler, W., *The Mentality of Apes,* Harcourt, Brace & Co., 1926, pp. 42-46.

what actually happens, what pitch modifications occur, when a melody is sung by several great artists.

Material and Subjects.

The tonoscope is an instrument which converts sound vibrations into pictures on a screen. This screen has eighteen thousand and ninety-five holes so placed that, when acted upon by a sensitive flame, they arrange themselves in characteristic figures for every possible pitch within the range of the human voice. Each figure points to a number on the screen which indicates the pitch. The holes are arranged into one hundred and ten rows, the first one having one hundred and ten holes, the third, one hundred and eleven holes, and so on, each successive alternate row having one more hole than the preceding one, up to the last, which has two hundred and nineteen holes. When a tone is sounded, the row which has the hole frequency that corresponds to the vibration frequency of the tone will stand still, while all other rows move and tend to blur. The row that stands still, or nearly still, therefore points to a number on the scale which designates the pitch of the tone. The tonoscope thus produces for the eye a picture of the vibrations of a tone, a picture which reveals details of pitch faithfully and far more finely than the ear can hear, thus affording a most sensitive, objective measurement of pitch. Every pitch movement of the voice is pictured on the screen, and the observer can tell at the very moment a tone is produced what error is involved, even down to a small fraction of a vibration.

The Bach-Gounod "Ave Maria" was chosen as a composition adapted for study on account of the prevalence of long sustained tones and the numerous phonograph records of it available as sung by famous artists. The renditions of the

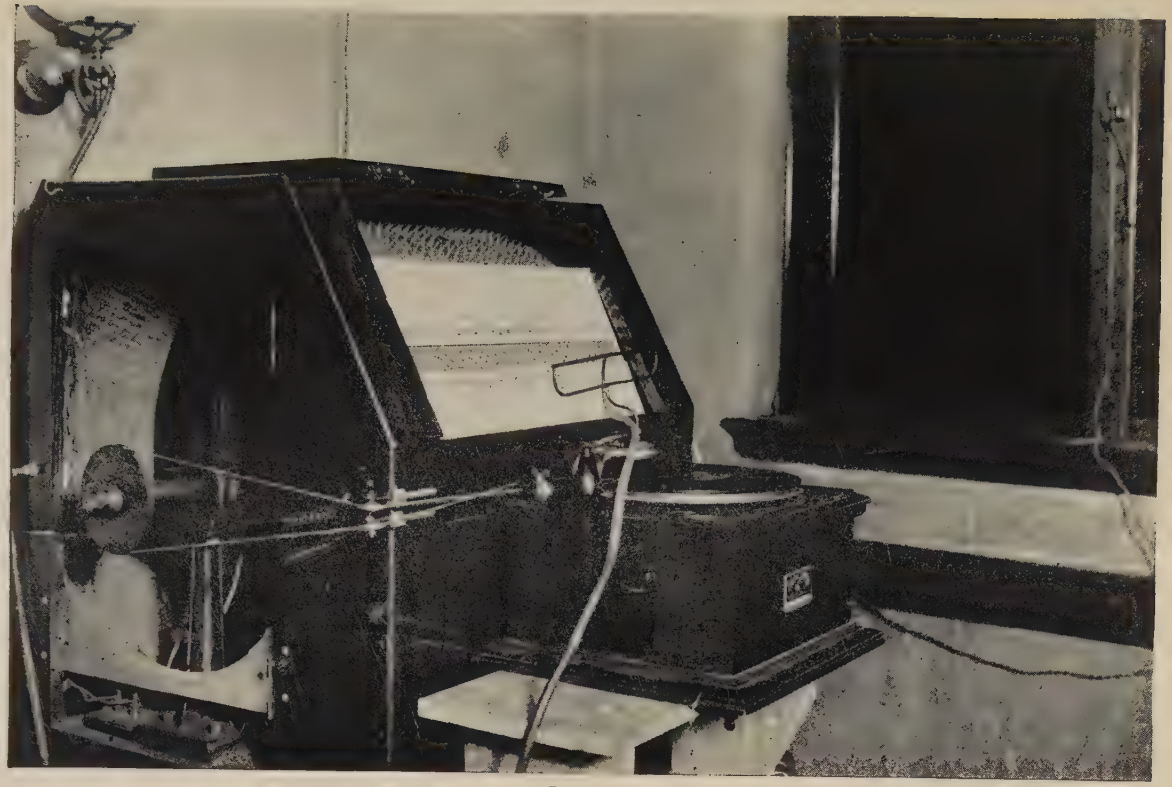


PLATE II.

The Tonoscope.

following singers, all sopranos, were selected: Nellie Melba, Alma Gluck, Frances Alda, Emma Eames, Emmy Destinn.

Under the general term "pitch" the following specific items were studied for each tone of the composition: attack, intonation, pitch fluctuations, release, tonal movement.

The "Ave Maria" contains one hundred and six sung tones, ranging in duration from a whole tone to a sixteenth tone, mostly whole, three-quarter, half, and quarter notes, is in the key of G major, and has a range from d′ to b″ in pitch. Data were obtained for every tone in the composition for the following nine items:

1. Attack: How a tone is attacked when preceded by (a) a higher tone, (b) a lower tone, (c) a rest, (d) when sung tone is of long duration, and (e) when it is of short duration.

2. Release: How a tone is released when succeeded by (a) a higher tone, (b) a lower tone, (c) a rest, (d) when the sung tone is of long duration, and (e) when it is of short duration.

3. Predominant pitch: If the tone undergoes several pitch changes while sustained, on which one of the several pitches is it mostly held, and what are the number and extent of the deviations above and below this predominant pitch?

4. Vowel: The effect of the vowel on which the tone is sung on the pitch of the tone.

5. Tonal movement: How the singer moves from tone to tone, whether he glides or leaps, and to what degree. Thus, in the case of a glide, the movement may be heavy and slow, the voice dwelling upon every vibration inter-

vening between the two tones, or it may be light and quick so as to be hardly perceptible to even the most acute ear.

FIG. 1. The tone *e″* as sung three different times by five different singers showing:
A, Attack
B-F, How the tone is sustained
G, The release
I, Pitch of standard tone as obtained from the piano
J, The average attack
K, Pitch of predominant sung tone (average pitch)
L, Release above and below
M, Average deviation above and below
N, Maximum deviation above and below
O, Rise of pitch in crescendo
P, Initial of singer

NORM TONE (at the bottom)
A, Standard pitch
B, Attack
C, Pitch of sung tone
D, Release
E, Average deviation above and below
F, Maximum deviation above and below
G, Rise of pitch in crescendo
I-M, Effect of vowel on pitch

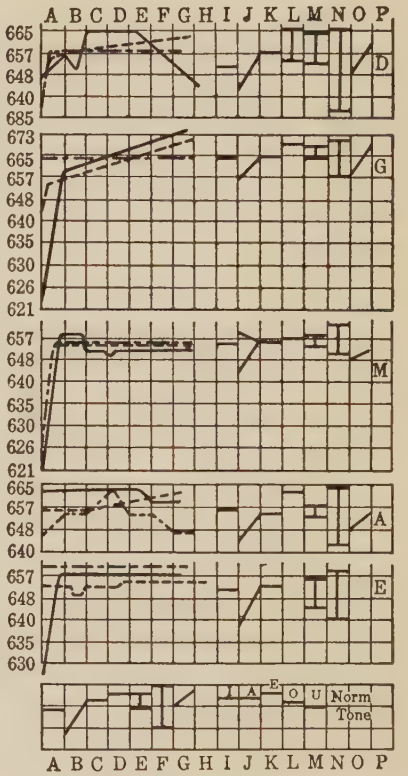


FIG. 1. INTONATION

6. The crescendo: The effect upon the pitch of a rise in the intensity of the tone.

7. Successive predominant pitches: When the same tone is sung several times in the course of the composition, how do the predominant pitches of the tone in the successive repetitions compare with one another?

8. Deviations: How the deviations above and below the predominant pitch of the sung tone compare with the standard pitch for that tone in pure and tempered intonation.

Conclusion.

Fig. I shows graphically the results of the measurements of intonation for the five singers. Each singer is represented by two graphs, one graph showing individual tone (the same tone as it is sung three different times throughout the composition), and the other graph showing a type indicative of the general characteristics of the singer. From these graphs we draw the following conclusions:

1. A tone is almost invariably attacked below the pitch intended when it is preceded by a lower tone, and in the majority of cases it is released above.

2. A tone is very rarely sustained on the same pitch for an interval of time beyond half a second, the number and extent of the deviations depending on the individual characteristics of the singer.

3. Two tones of the same pitch and of equal duration are never sung twice the same way; they vary in the number and the extent of the fluctuations as well as in the pitch of the predominant tones.

4. The vowel quality seems to have but an insignificant effect on the pitch of the tone, although there is a slight tendency to sing the vowel *e* highest, *a* and *i* next, and *o* and *u* lowest.

5. The five singers are divisible into three classes in the matter of tonal steadiness and the number and extent of the fluctuations: Melba and Gluck have the steadiest

voices with the fewest and smallest fluctuations, Eames has a steady tone with few fluctuations, but of marked extent when they occur, while Alda and Destinn manifest unsteady tones with fluctuations large in number and extent.

6. The movement from tone to tone is predominantly in the form of glides, but varies in degree for the different singers, being heavier for some than for others.

7. A tendency for a rise in pitch with a rise in intensity is manifest throughout.

8. There exists a tendency for all the singers to sing sharp, in the sense that the deviations above the predominant tone are more numerous than those below, but the maximum deviations below the predominant tone are always larger than those above.

IV

THE METHOD OF GROUP EXPERIMENTATION

Problem.

What is the most efficient distribution of time in practicing a simple habit function?

Method.[1]

One hundred sixty-one college students practiced for one hour the addition of two-place numbers. The students were divided into three groups of about fifty students each. Group 1 worked continuously for one hour; Group 2 worked 20 minutes each day for three days; Group 3 worked ten minutes a day for six days.

[1] REED, H. B., "Distributed Practice in Addition," *Journal of Educational Psychology,* 1924, Vol. XV, pp. 248-249.

Results.

The improvement from the first ten minutes of practice to the last ten minutes was measured.

Group 1 (1 60 min. period) made a relative gain of 12.2

Group 2 (3 20 min. periods) made a relative gain of 43.4

Group 3 (6 10 min. periods) made a relative gain of 33.6

Conclusion.

In the improvement of a simple habit function such as addition, a great advantage is secured by distributing the practice time rather than by concentrating it. Several other experiments verify the finding that about 20 minutes is the optimum period while longer or shorter periods are wasteful.

V

The Scope of Psychology

With these three methods as its tools, each supplementary of the others, one serving as a check upon the others, and each better adapted for certain purposes than the others, psychology has attacked every problem regarding the affairs, activities, and interests of men. It has consequently become highly specialized, and has developed a number of branches, each branch taking for its province some one phase of human nature. These branches are:

1. *Comparative Psychology:* the study of the nature and laws of mental evolution in general.

2. *Genetic Psychology:* the study of the nature and the laws of mental development in the individual.

3. *Child Psychology:* the study of the nature and the laws of the mind from infancy through adolescence.

4. *Adult Psychology:* the study of the nature and the laws of the mature mind.

5. *Abnormal Psychology:* the study of the nature and the laws of the mind in an unbalanced state.

6. *Social Psychology:* the study of the nature and the laws of group life.

7. *Racial Psychology:* the study of racial characteristics and differences.

8. *The Psychology of Art:* the study of the nature of the æsthetic experience.

9. *The Psychology of Religion:* the study of the nature of the religious experience.

10. *Psychiatry* makes use of the findings of abnormal psychology as a guide in the treatment of functional disorders of the mind, such as the various forms of insanity, hysteria, morbid fears, criminal tendencies, and various types of delinquency.

11. *Educational Psychology* applies the laws of the development and functioning of the mind to the problem of the most economical and effective ways of learning.

12. *Vocational Psychology* utilizes the findings of psychology for the purpose of guiding the individual into an adequate vocational channel.

13. *Personnel Psychology*, the psychology of advertising, of salesmanship, goes to the fountain of adult normal psychology to find the most effective ways for managing people in industry and the best manner of selling commercial goods.

14. *Legal Psychology* finds useful material in abnormal psychology for the more adequate treatment of criminals and delinquents, and in normal adult psychology on the reliability of legal testimony.

15. *Applied Social Psychology* goes to social psychology for principles of social adjustment and improvement, to abnormal psychology and child psychology for guidance in effective social work, child welfare, eugenics, and community welfare.

CHAPTER III

THE MEANING OF HUMAN NATURE AND ITS BODILY BASIS

Questions this chapter seeks to answer: What is human nature in general? What is involved in an adjustment to a situation? What is a situation or stimulus? What is the machinery or mechanism that makes adjustments possible, and how does it work? Why is psychology interested in the nervous system? What does the study of the nervous system teach us about the relationship between mind and behavior? What does it tell us about the subject matter of psychology and how to approach this subject matter?

WE HAVE seen that human nature presents a double aspect, one subjective, or mind, the other objective, or behavior; and that the purpose of psychology is to study mind in terms of behavior. It would be possible for us to plunge at once into an analysis of mind and behavior, but all we would get out of such a procedure would be a mass of details which would only be so much mental luggage, since we would not know what the details mean. To break up a machine into its parts is worthless unless we know what the machine as a whole is good for. A part receives its significance from the whole of which it is a part. When isolated from the whole it has no meaning. Similarly with human nature. Acts, feelings, thoughts, and all other details

of human nature, are processes that fulfill a certain function. Unless this function is ever present before us, we have no real understanding of the processes themselves. We may have knowledge, but we have no understanding. A living organism engages in certain activities because it is driven to do so by something in order to accomplish something. When a problem is set before us we engage in certain acts, thoughts and feelings in an attempt to solve it. It is these acts, thoughts and feelings that we mean when we speak of human nature, and with the analysis of which psychology is concerned. But these acts, thoughts and feelings are neither their own cause nor their own end. They are rather the effects of some cause and lead to some end other than themselves. To understand the meaning of the effect we must see it in the light of its cause and the result that it is intended to accomplish. Thus, we never *think thought*, but the thought is *about something* and tends *toward something* other than itself. We never *feel feeling*, but we feel *about something*, and the feeling *about* the *something* results in a certain attitude toward the something that caused the feeling. We never *act acting*, but we act toward something, the purpose of the act being outside and beyond the act itself. Hence, simply to analyze and learn the factors of human nature is insufficient. In order to be understood, these factors must be seen in the light of the whole process of which they are a part. We must therefore consider what human nature is as a whole before we proceed to analyze it into its details.

Human nature must be seen as a whole if its analysis is to be significant

I

THE NATURE OF HUMAN NATURE

Whatever it is that life means or may mean is a matter for speculation, and the answer will differ with the mood and temperament of the speculator. Is life worth living, and what is it worth living for, are questions to which philosophy gives one answer, religion another, and each philosopher and religionist his own private answer to suit his personal inclination. Thus pessimist and optimist, idealist and materialist, speculate, prove, discuss, and quarrel. But to the question as to what the function of life is, there can be but one answer, and that a simple one. The function of life is to live. For the biologist, whose business it is to deal with life in its elemental basic nature, life reveals itself in its operations. Life *is* what life *does*. And what it does is apparent on the surface and needs no speculation. What life does is to live, and to persist in living. As soon as an organism comes into the world, all of its basic activities are devoted to maintaining the life that was given to it. That the function of life is to live is the basic fact, the unit, the whole, in the light of which all activities of living organisms, the activities which we summarize in the phrase *animal nature*, whether human or infra-human, must be viewed in order to be understood. This one basic fact will reveal to us not only what human nature *does as a whole* but also what *it is in its details*. It enables us to proceed from the whole to its parts and also suggests the method for studying the part-whole relationship.

The nature of life is revealed in its operations

II

THE CONDITIONS OF LIFE

The whole is life; the parts are what the animal does in order to maintain life. Our problem then is to examine what a living organism must do in order to keep on living. Here also there is no need for speculation. All we need do is call upon our own experience and common observation. When we are thrown into a new environment, or when we place any animal in a novel situation, some sort of adjustment must take place if life is to continue. To live is to bring about an adjustment between the *inner*—the needs of the organism—and the *outer*—the material through which the needs are met. Hence our examination of human nature begins with formula:

Life = Situation calling for an Adjustment

or

$$L = S \longrightarrow A$$

But what makes an adjustment to a situation possible? What must the animal be able to do in order to meet a situation? The answer to this question will bring us directly to the subject matter of psychology, mind and behavior, and hence, to the nature of human nature. In order to meet a situation, the animal must be able to become *aware* of something being present before it, and must *react* to the something. In other words, it must *experience* something, and it must *react* in some way, do something. The *experiencing* and *reacting* are the *means* whereby the adjustment is made.

Human nature is the means whereby life is maintained

The adjustment is the end result of the experiencing and the reacting, both of which are the effects of the situation operating upon the animal. The experiencing and the reacting together constitute the *response* to the situation or stimulus. Hence our formula for life now becomes expanded to include the response factor. We now have:

$$S \longrightarrow R\ (ER) \longrightarrow A,$$

or the situation arousing a response (consisting of an experience and a reaction), and the response resulting in some sort of adjustment to the situation.

III

THE CHARACTERISTICS OF THE PSYCHOLOGICAL STIMULUS

Psychology concerns itself with the experience-reaction factor, or with what it is that happens between the causing stimulus and the resulting adjustment. A stimulus is any force acting upon the organism and provoking a response. A response is a modification of any state of being of the organism at any given time. The stimulating force may be within or outside the organism, so that we have two kinds of stimuli, internal and external, or bodily and non-bodily. Hunger is a response to a bodily stimulus, the action of the stomach muscles. Seeing and hearing are responses to non-bodily stimuli, the action of physical waves. We shall discuss later on in this chapter the nature of internal stimuli, and how they interact with and influence external stimuli. At present we want to examine external stimuli in their psychological aspects.

Stimuli are external and internal

The external psychological stimulus, that is, the stimulus which the organism responds to, is something quite different

from what actually occurs in nature, and with which the physicist is concerned. The psychological stimulus differs from the physical occurrence in two respects. The external stimulus

In the first place, physics tells us that objects such as tables, chairs, rocks and trees are not the solid substances that we experience them to be, but are made up of an immense number of minute particles carrying a charge of negative electricity, called electrons, revolving at great speed in orbits around another particle of matter carrying a positive electric charge, called a proton. A solid bit of matter is then ultimately mostly empty space. It is like the Irishman's definition of a net as a number of holes tied together by strings. There is thus a difference even for the physicist between what he sees in a chair—for instance, as he sits down to his dinner, when he is just a human being—and what he sees in the same object when he is primarily a physicist. If you ask a physicist offhand under ordinary circumstances whether there is a chair in the room, he will reply, as would the ordinary person, "There it is, can't you see it?" But if you ask him what a chair is, he may not reply, as would the ordinary person, that a chair is an object to sit upon, having a certain form, but he is liable to say that a chair is a mass of electrons and protons close together. The psychological stimulus is not the physical system of protons and electrons, but what this system is *experienced to be by an experient.* It is an experience

In the second place, the psychological stimulus is a mental construct, a picture, formed out of what is given physically as colors, shades, shapes, sizes, etc., and not these physical radiations in themselves, taken together. Let us consider a few illustrations to see what this means. It is a configuration

If we look at the accompanying figure, we notice that it

possesses different properties, depending on whether we fix our attention upon the white parts or the black parts. If the attention is on the white parts, these become the figure and the black parts its background, and *vice versa.* A pattern appears as actually two different things when perceived now as ground and now as figure. That is, the shift from one to the other is accompanied by changes in the observed or phenomenal properties. The response is to these phenomenal changes and not to the picture as a physical thing.

Apes were trained to take their food from the darker of two containers. When a third still darker container was presented with the other containers, the animals took their food

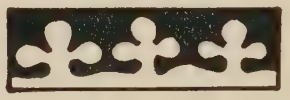


FIG. 2

from the darkest container present. They responded not to physical "dark" but to psychological "darker than."

Whenever an element is removed from or added to the total stimulus it affects all the other elements or parts. In the aggregate stimulus the parts lose their independence and a change in one of them affects all the rest. The response is to this innerness which is a mental factor and not a physical property of the stimulus.

In sum, the psychological stimulus is a form, a pattern, a configuration which is evolved out of the physical elements contained in any situation. The response is to this general form and pattern and not to the specifically existing parts as forming an aggregate. This means that there is no sharp line of demarcation between situation and response, because

the situation to which the response is made is in itself a response, in that it is something built by the organisms on the basis of the physical elements presented to it from the outside.

IV

THE MACHINERY AND MECHANISM OF HUMAN NATURE

With this brief account of what human nature is in general, and the characteristics of the external stimuli through which it operates, we must make a brief but bold adventure into the bodily basis of the experience-reaction process. If our analysis of mind and behavior is to be systematic instead of pell-mell and hit or miss, we must see, in the first place, what the relationship between the two is. The importance of this we have already seen in the discussion of the nature and objective of psychology. In the second place, if the meaning of the terms mind and behavior is obscure no systematic analysis of them is possible, since analysis means taking apart, and unless we know just what it is that we are analyzing we are simply fumbling about in darkness. If we are to know what we are studying and how we are studying it, we must ascertain these two points about mind and behavior. And we can do so only by examining the machinery of which both mind and behavior are the products. This machinery is the nervous system.

The nervous system is the key to an understanding of mind and behavior

The tremendous significance of the nervous system can be estimated only in terms of the significance of life itself. Whatever an animal is, the kind of existence it leads is determined by the kind of nervous system with which it is provided. The simple, unspecialized nervous organization of the amœba creates for it a simple world and a simple life. The

The evolution of life is the evolution of the nervous system

more highly specialized nervous system of the bird opens up a more complex world, resulting in a more varied existence. For man, whose nervous organization is most complex and most highly specialized, the world is most extensive and differentiated, and his life is, accordingly, most varied. The world in which the organism lives, and the kind of life it lives, depend upon the structure and texture of the nervous system it possesses. The evolution of life is thus the evolution of the nervous system.

The same holds true for the differences prevailing among individuals. One person is intense, another phlegmatic. One is cold, another passionate. There are idealists, and there are hard-headed materialists. There are artists, philosophers, scientists, religionists, and there are tradesmen, professional politicians, and professional reformers, each man's life being ordered according to his outlook and inclination. These variations, instead of being mere accidents, lie rooted in the very nerve tissue of the individual. Perhaps no other pursuit in which men engage has such far-reaching implications for ultimate human welfare as the study of the structure and function of the nervous system, known as neurology.

The individual is the nervous system

V

THE STRUCTURE AND OPERATION OF THE NERVOUS SYSTEM

The machinery of human nature includes two main divisions: a *sensory-motor* division consisting of sense organs, muscles and glands, and a *nerve* division consisting of a system or network of nerves scattered over the body connecting sense organs with muscles and glands. It is apparent that in these two parts of the machinery we have the apparatus

for the $S \longrightarrow R\ (ER) \longrightarrow A$ process. The sense organs receive the stimulus, the nerves communicate it to the muscles or glands, which do the work that results in the adjustment.

The machinery of adjustment has two main parts: a sensory-motor part and a nervous part

a.—THE RECEIVING MECHANISM

The $S \longrightarrow R\ (ER) \longrightarrow A$ procedure begins in the sense organs; hence our study of the machinery of mind and behavior must begin with these remarkable instruments.

What are sense organs, and what is their significance?

The sense organs are the receiving mechanism, the outposts of the nervous system, that catch whatever is going on in their vicinity, either inside or outside the body, and send the message on to its destination, which is always some muscle or gland. They put the nervous system in touch with the external world of matter and with other parts of the body. They are the doorways which open and admit the visitor who knocks at the gateway of mind. The visitor is never refused admission so long as the gateways are operating, but he must always first present himself here and apply for entrance. There is no other way he can enter. There is no mental process that has not at some time been a sensory process.

The sense organs are the gateways of the mind

The evolution of the sense organs constitutes one of the most fascinating romances of the panorama of life. A sense organ is an area of the lining of the body so highly specialized that it will respond to only one type of stimulation. Consequently, the number of such sensitive areas that an animal possesses determines the number of stimuli to which it will respond. Sense organs thus determine the extensity

The sense organs mean the world in which the animal lives

and variety of the world in which an organism dwells. The evolution of the number of sense organs is the story of the gradual unfolding of a world of varied and vivid phenomena arising out of obscure disorder.

But the evolution of the sense organs has taken place not only in the number of the organs but also in their fitness. All eyes, ears, noses are not of equal quality even in those animals that possess them. The eye of the fish is not that of the bird, and the eye of the bird is not that of man. Numerous experiments have been carried on to ascertain whether rats, chickens, fish, dogs, and other animals recognize differences in colors, tones, or odors. The results are neither definite nor reliable. But it is certain that each sense organ has had an evolution from a somewhat crude organ to one highly efficient. Take the eye as a case in point. Originally this sense organ could register only light, and animals that possess a rudimentary eye experience neither color nor space. "After geological ages," to quote an authority, "a crude lens was gradually formed with the accessory mechanism necessary for giving information about size, form, and distance of objects. Much later than this the primitive retina became sensitive to color by means of which the eye could give information about the quality of objects known through color. Thus, seeing animals gained a mastery of a large environment, being able to guide themselves with reference to the location and character of objects at a distance."[1]

Likewise the fitness of each sense organ

But not only do the sense organs reveal the world in which the animal lives, but in revealing it they also circumscribe and limit it. The eye will not respond to all light stimuli, nor

[1] SEASHORE, CARL E., *Introduction to Psychology*, p. 17. Copyright, 1923, by The Macmillan Company, and reprinted by permission.

the ear to all sound stimuli. A stimulus must be within certain limits, and above and below these limits the sense organ will not respond. Sense organs, like any other machines, are limited in range and functioning. There is a universe of physical phenomena, a world of happenings, that cannot penetrate the windows of mind. When we speak of infra-red and ultra-violet rays we refer to the range of the spectrum, or light rays, beyond which the eye does not function. Again, we speak of noises and tones. A noise is a sound wave of such complexity, brevity, or high frequency (pitch) that the ear cannot analyze it. There are particles of matter constantly touching the sense organs of the skin, but their impact is so slight that they evoke no response. Our sense organs, even at their best, thus permit us to experience but a small fraction of the physical universe that surrounds us. Man, however, refusing to be limited by nature, has devised accessory instruments which extend the range of his sensory equipment and enable him to get in touch with an unseen and unheard universe. The naked eye reveals two or four thousand stars; but the telescope, an extension of the eye, increases the heavenly host to hundreds of thousands, and a photographic plate to as many millions. An instrument will register the heat of a candle at a distance of a mile and a half, to which the body is insensitive. We know of the existence of rays and waves by the effects they produce on instruments that man has devised. With the aid of instruments we "see" atoms and electrons, and minute living organisms, unicellular or noncellular, microbes and bacilli, less than one five-thousandth of an inch in length. And man, with the help of artificial sense organs, has just made a beginning in the exploration of his world.

Sense organs also limit the world

They also color the world

The sense organs, besides determining the range of our world, color it as well. Philosophers are still battling, and will keep on doing so, as to the nature of the objective universe—whether we experience things as they actually exist or only as our senses permit us to know them. If our sense organs were differently constructed, would the world also seem different? When two persons view the same object, and one calls it red and the other gray, we say that one of them is color-blind. But may not all of us be color-blind? Where is the color of an object; is it in the eye or in the object? Where is the squareness, roundness, height, depth of objects? What would happen to the looks of things if we did not have stereoscopic vision? Where is sound; in us or in the atmosphere? The quite apparent answer of psychology to this philosophic problem of "appearances versus reality" is that given by the great philosopher Kant. We know that things are happening outside of ourselves, since our sense organs must be aroused to activity by objective stimulation. But the nature of these stimuli, apart from what our experience tells us of them, we can never know.

The structure and functioning of the sense organs belong to anatomy and physiology. But a brief account of the main features is not out of place here. Most sense organs are composed of an *end-organ* or *receptor* and accessory apparatus. The receptor is that part of the sense organ which comes in direct contact with a nerve ending. It is therefore the essential structure of the receiving mechanism.

The Kinds of Sense Organs.—All the receptors may be classified into three groups, according to the source or origin of their stimuli. Some of them are stimulated by objects that act upon them from a distance through some medium; others

act only when the stimulating object is in direct contact with them; and still others have their stimuli within the body. We therefore have:

There are three kinds of sense organs

1. *Exteroceptors*, located on the external surface of the body. They are stimulated by some external agent which acts either from a distance through a medium, or by acting directly on the sense organ. They are therefore known either as distance receptors or contact receptors. But the distinction between distant and contact receptors is not sharply drawn. Thus the receptors for vision, hearing, and smell, which are normally activated by stimuli at a distance from them, can also be stimulated by direct contact—for instance, a blow on the head, making one see stars or hear noises. Likewise the receptors for pain and temperature are stimulated either by contact or at a distance. The receptors for taste are the only exclusive contact receptors. The exteroceptors are the traditional five sense organs—ear, eye, nose, tongue, and skin.

1. Exteroceptors

2. *Interoceptors*. These are found along the alimentary tract. Here belong the receptors for thirst, hunger, and for other visceral sensations.

2. Interoceptors

3. *Proprioceptors*, which lie between the external surface of the body and the internal surface. They are found chiefly in the muscles, joints, tendons, and semicircular canals of the ear.

3. Proprioceptors

The end-organ of the eye is the retina with its layer of rods and cones. There are estimated to be 137,000,000 rods and cones in the retina, and they are affected by a certain limited range of light waves, 397 μ (violet)—760 μ (red). The retina is transparent, and the light waves, as they come from the accessory mechanisms—the cornea, aqueous humor, lens, and vitreous humor—strike upon the retina and pass

The eye

through to the layer of rods and cones. Here a chemical change is set up which starts the impulse in the optic nerve. The rods function in dim light or twilight vision; the cones,

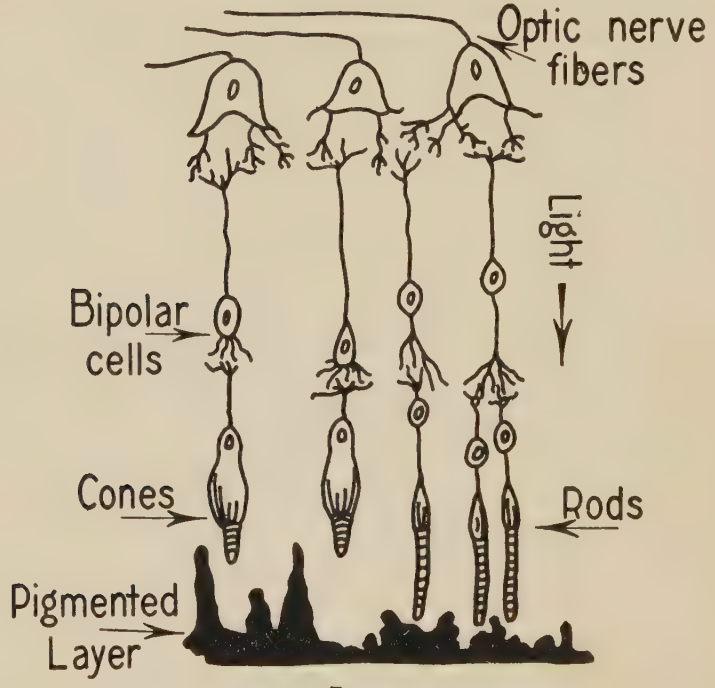


FIG. 3

The receptors of vision in the retina, and their connection with the optic nerve. The arrow indicates the direction of light. As the light passes through the retina it is stopped by the pigmented layer, arousing the rods and cones to activity, and sending an impulse to the optic nerve via the bipolar cells.

(From GATES, *Elementary Psychology*, copyright, 1925, by The Macmillan Company. Reproduced by permission.)

in bright light. The cones are in the center of the retina so that this part is less sensitive to dim illumination.

The ear

The end-organ of hearing consists of the hair cells of the basilar membrane lying in the cochlea of the inner ear. The hair cells will report tones only within a certain limited

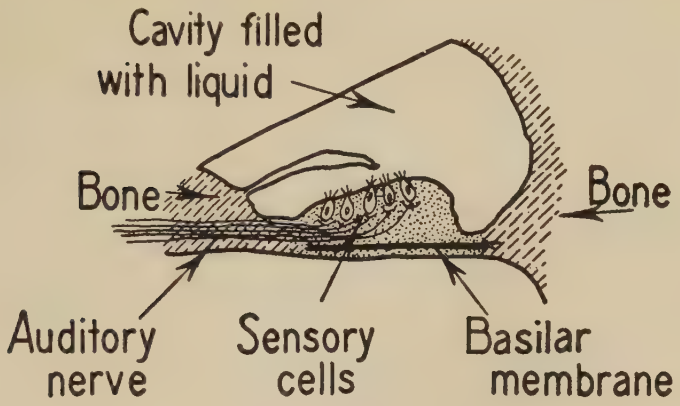


FIG. 4

Hearing receptors in the inner ear. The sensory cells are stimulated by the vibration of the basilar membrane, which in turn is activated by pulsations of the liquid in the cavity.

(From GATES, *Elementary Psychology*, copyright, 1925, by The Macmillan Company. Reproduced by permission.)

range of wave frequencies (roughly, from 18 to 30,000 d. v.). The wave is picked up by the eardrum and transmitted by three bones of the middle ear into the inner ear. Here the hair cells become activated and start an impulse in the auditory nerve.

The end-organ of taste consists of ciliated cells in the taste buds found in the walls and crevices of the tongue. For a sub-

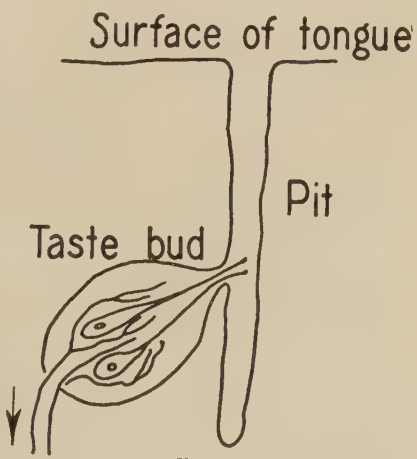


FIG. 5

Taste receptors within a taste bud, showing the nerve-fibers coiling around the base of the sense cells.

(From WOODWORTH, *Psychology*, Henry Holt and Co. Reproduced by permission.)

The tongue

stance to come in contact with the taste buds, it must be in liquid or soluble form. The substance causes some form of energy change in the hair cells which are in close connection with the nerve ending in which they excite an impulse. Some differences among the taste buds in different parts of the tongue have been described. Thus at the tip of the tongue, there is greater sensitivity to sweet, along the sides to sour,

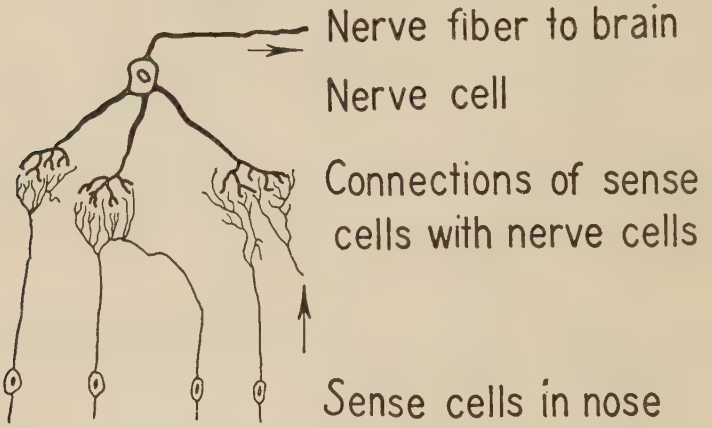


FIG. 6
Smell receptors with brain connections.
(From WOODWORTH, *Psychology,* Henry Holt and Co. Reproduced by permission.)

toward the back to bitter, while sensitivity to salts is somewhat generally distributed.

The nose

The end-organ of smell is composed of ciliated cells located in the mucous membrane in the upper part of the nasal passages. A unique feature of the end-organs of smell is that they are actual parts of the olfactory nerve, fibres of which run out to the surface of the mucous lining and terminate in fine hairs which extend into the nasal passage. The smell organ is stimulated by substances in the form of gaseous particles

coming in direct contact with it and causing a chemical excitation.

The skin contains several receptors. What has up until quite recently been called the "sense of touch" is not one "sense" but several. There are three kinds of receptors in the skin, one set for cold, another for warmth and another for pain. These receptors, or cold, warm, and pain "spots," are distributed all over the skin or just beneath it, there being more of one kind than another within a certain area. The cornea of the eye is rich in pain receptors, while the inner surface of the eyelids, the white of the eye, the forehead, are well supplied with cold and warm spots. The skin can be explored and the areas with their particular spots located. A certain small area is usually sensitive to but one kind of stimulation. There are supposed to be from 2,000,000 to 4,000,000 pain spots on the body, while about 500,000 cold spots and 30,000 warm spots have been mapped out, and about 50,000 that are stimulated by gentle stroking.

The skin

Muscles contain sense organs in the form of muscle-spindles, consisting of one or more muscle-fibres enclosed in a sheath. "One or more nerve-fibres pierce this sheath and make many spiral turns round the muscle-fibres, ending in a knob on the surface. When the muscle contracts, messages are started off on these nerve-fibres and go towards the nervous system, giving us our 'muscle sense.' These muscle-spindles tell us what is happening in our muscles—whether they are contracting or being stretched and the force they are exerting. In the tendons of the muscles and in the joints are other receivers, telling us what is happening in them."[1]

The muscles

In the inner ear there are sensitive mechanisms in the shape

[1] HILL, A. V., *Living Machinery,* Harcourt, Brace & Co., 1927, p. 166.

The semicircular canal

of semicircular canals, three in each ear, arranged in three planes at right angles to one another. They are filled with lymph and contain nerve endings at one end. These structures are concerned with balance and bodily posture. They tell us about our position in space, how far we are turning, in what direction, and whether we are right way up or not. When the head is turned the lymph lags behind in the canals and presses on the corresponding nerve endings. If the head movement is continued, the lymph takes on the motion of the head and ceases to press on the nerve ending. If the head motion is suddenly stopped, the lymph continues its movements and we become dizzy, that is, we appear to be turning in the opposite direction.

From this brief excursion into the structure of sense organs we get the following schema of receptors, their stimuli, and the experiences to which they give rise:

Receptors	*Stimuli*	*Experiences*
1. Exteroceptors:		
Eye (retina)	Electromagnetic waves	Vision
Ear (cochlea)	Air waves	Hearing
Nose (mucous membrane)	Gaseous particles	Smell
Tongue (buds)	Sapid fluids	Taste
Skin ("spots")	Warm and cold objects	Temperature
	Contact	Touch, pain
2. Interoceptors:		
Smooth muscles and glands	Anything that affects bodily condition	Hunger, pain, general organic state

Receptors	*Stimuli*	*Experiences*
3. Proprioceptors:		
Striped muscles	Movement of parts of body	Strain, relaxation,
Canals in ear	Movement of entire body	equilibrium

b.—THE REACTING MECHANISM

We now turn to the other end of our machinery of adjustment, the mechanisms where the final step of the $S \longrightarrow A$ process is carried out. This mechanism consists of muscles and glands.

Muscles are mainly of two kinds, popularly known as voluntary and involuntary, more technically as striped or skeletal, and unstriped or visceral. Voluntary muscles respond to a direct order. We have control over them. We can order them to work or not to work. These muscles manipulate the limbs attached to the skeleton. They move the body. Involuntary muscles cannot be directly controlled. They operate our vital organs, such as the digestive apparatus, heart, and blood vessels. Their job is the management of the internal domestic affairs of the body—digestion, pulse, heart beat, blood circulation.

Muscles are either voluntary or involuntary

How the Muscles Work.—A voluntary muscle is made up of thousands of fibers and has stripes or cross-striations at regular intervals across it. The muscle fibers lie side by side in bundles. Besides these bundles of fibers, the muscle contains a maze of blood vessels which supply it with food and oxygen. The amount of blood flowing to the muscle depends on how hard it is working. When at rest the supply is small;

A muscle works by twitches

when at work it is greater. Each muscle fiber is joined to a nerve fiber at the nerve ending.

When a message from a nerve fiber reaches the muscle fiber it gives a twitch, and the work of the muscle as a whole consists of a fusion of a vast number of single twitches. This fusion of twitches constitutes the contraction of the muscle. Thus a twitch is the elementary unit out of which all muscular contraction is built up. When a muscle gives a twitch it has been shown experimentally that an electric wave travels along it. A contraction means a shortening of the muscle. The work performed by this shortening consists of a pulling upon the bone to which the muscle is attached. If the muscle is not allowed to shorten it gets hard and stiff. In such cases it exerts a force, such as holding a limb in position, but it does no work.

The following is an account by Professor Hill of an experiment on a muscle.

How muscles work is established by experiment

We may make a preparation consisting of a muscle and a nerve. The best known of such preparations is the gastrocnemius-sciatic preparation of the frog. The nerve can be stimulated by an electric shock, a message passes along it, and if the muscle is still connected to the nerve, the fibres of the muscle receive the messages from their individual nerve-fibres and respond. The nerves are not part of the muscle; they make some kind of contact with it at the nerve-ending, but that contact can be broken by various things, of which perhaps the most interesting is the drug curare, an Indian arrow poison which causes paralysis by blocking the contact between the nerve-ending and the muscle fibre. Fatigue also has the same effect, but in a less degree. Even, however, when the nerve is completely blocked, it is possible to excite the muscle directly by an electric shock. The wires carrying the current are laid directly on the muscle. Muscle is not as excitable

as nerve. In other words, it requires a stronger shock than nerve to excite it; still it responds very well, and much of the work that has been done on muscle has employed direct electrical stimulation of the muscle-fibres. Let us examine what happens when a muscle is excited, either directly or through its nerve, by a single electric shock.

The visible thing that happens is a twitch. The muscle shortens if it can and moves a weight hanging on it; if the weight is too heavy to move, the muscle stiffens and exerts a greater force. Then the muscle relaxes, lets the weight down again, and its stiffening and tension disappear. This however, is not all. By means of delicate instruments it can be shown that the temperature of the muscle rises; in fact, in a single twitch it rises about $\frac{3}{1000}$ of a degree Centigrade. If we examine it still more closely we find that heat is produced not only while the muscle is contracting and relaxing, but for a long period afterwards; in fact, one and a half times as much heat is liberated after the contraction is over as during it. *Activity,* as we shall see more in detail later, is followed by a prolonged process of *recovery.* If we look into the matter further we find that oxygen is consumed, carbon dioxide produced, and sugar burned. Finally, it is easy to prove that during its contraction the muscle is electrically active, just as a nerve is. An electric wave moves along it at high speed, and this can be recorded, as was mentioned earlier, while it passes the electrodes by which a galvanometer is brought in contact with the muscle.[1]

A muscle fatigues. What happens in the muscle in fatigue is shown by the following experiment:

If the two legs of an anæsthetised animal be prepared, so that two corresponding muscles (one in each leg) write records on the same drum when their nerves are stimulated by the same shocks, we find that they fatigue at the same rate if they are treated in the same way. If, however, the artery supplying blood

[1] HILL, A. V., *op. cit.,* pp. 55-56.

to one of them be clamped so that the blood to it is stopped, we notice that fatigue comes on very much more rapidly in the muscle of the bloodless limb; whereas the muscle supplied with blood goes on contracting for a long time—indeed almost indefinitely—the bloodless muscle will have reached a stage of complete paralysis in a few minutes. We know, of course, the same thing in ourselves. A violent and continuous effort in a small group of muscles—such, for example, as holding the body up with arms bent on rings in a gymnasium—largely hinders the free supply of blood to the muscles by pressing too heavily on their arteries and veins. In that case fatigue comes on, to the stage of almost complete exhaustion, within a minute; whereas when the limbs are moving and the muscles free, and the blood circulating easily through them, quite violent efforts may be made and exhaustion may not occur for a long while.[1]

Involuntary Muscles and Glands.—The involuntary or visceral muscles and the glands play an important rôle in feeling and emotion and therefore call for discussion in a book on psychology. Involuntary muscles move or contract slowly in comparison with voluntary muscles. The single largest visceral muscle is the stomach. It consists of three layers of plain muscle fibers. Digestion consists of a churning process executed by the movements of these muscles. All organic processes in addition to that of digestion, namely, pulse, heart beat, blood circulation, etc., are controlled and regulated by involuntary muscles.

Glands are involuntary muscles and are of two kinds

The glands are parts of the visceral system, and produce substances known as secretions. These secretions play an important part in both mind and behavior.

There are two kinds of glands: those that have an external outlet and consequently discharge their secretions either on

[1] *Ibid.*, p. 58.

the surface of the body or into some body cavity, and are called duct glands. The other kind have no external outlet, discharge their chemical fluids or solids directly into the blood, and are therefore known as ductless or endocrine glands.

The duct glands are the salivary, tear, sweat, digestive, liver, kidney, pancreas. Still others are found lining the alimentary tract and all the mucous surfaces found in the nasal passages, the mouth, throat, and sex organs. The role of these glands in behavior is well put by Dr. John B. Watson in his typical picturesque language.

Duct glands

You may not think at first of the glands as being of especial importance as reacting organs, but if I peel an onion in your presence or release tear gas you may stand stock still but your eyes begin to drip water. Likewise if pain stimulation becomes intense tears begin to flow. Tear response may become conditioned—sad news may cause a copious flow of tears—the mere sight of the doctor may bring honest tears to the eyes of the three-year-old. This type of reaction, feigned or real, has saved many of us from just chastisement at the hands of our parents, has filled the tin cups of beggars and won many elections for politicians. Tears of females have more than once swayed the fate of empires.

They are important in behavior

Will you take my word for it that our so-called higher forms of behavior are terribly at the mercy of just these lowly secretions we have been talking about, especially when something goes wrong with one or more of them? Let the mouth glands begin to over-secrete or under-secrete as happens at times; or the small mucous glands begin to over-secrete as they do in the nose when we have a cold; let something go wrong with the digestive secretions, or let the throat become irritable and sensitive through lack of secretions; let the kidney over-secrete and keep the bladder overly full, or the secretions from the sex

organs become excessive—then our whole conduct may become modified. Even our social behavior may become involved. We may insult or hurt the feelings of a friend, spoil a piece of fine work, even lose our jobs, and, what is worse, if the faulty glands are deep down in the visceral cavity we may be able to give no verbal account of what has gone wrong.[1]

Ductless glands

The products of the ductless glands are taken up by the blood, and act as drugs upon the body. They influence the nutrition of the body and its growth, and also affect the work of visceral and skeletal muscles, thus influencing behavior.

Thyroid

The thyroid gland lies just below the Adam's apple. It secretes a powerful chemical called thyroxin. If the functioning of thyroid is faulty in the child, bodily growth is arrested, the reproductive organs fail to develop, and mental growth is greatly retarded. Such a child remains infantile in mind and behavior. This condition is known as cretinism. In adults a deficient thyroid, or a complete loss of thyroid produces a dry skin, brittle falling hair, increased weight and general inactivity. If the gland is over-developed it causes fast heart action, general malaise, irritability, and a host of other symptoms.

Parathyroid

The parathyroid glands are located close to the thyroid. Their complete removal means immediate death. The animal develops spasms, a rise in temperature, rapid respiration, vomiting, diarrhea, and finally it dies. It probably also has an effect on the nervous system by interfering with the discharge of nerve cells.

The adrenal glands are found one on each side right above the kidneys. Their removal also results in death. Their secre-

[1] WATSON, JOHN B., *Behaviorism*, W. W. Norton, 1924, p. 62.

tion, adrenin, plays a great part in emotional excitement. In such conditions adrenin in large quantities is discharged into the blood, to enable the muscles to function under stress. Adrenal

The pituitary gland is found underneath the brain. It is divided essentially into a posterior and anterior part, each part differing in function. Over-secretion of the anterior part results in gigantism, or excessive bodily growth. The removal of the posterior part arrests the growth of the sex glands and the animal frequently becomes sexually impotent. Pituitary

The pineal gland is situated in the brain. Its function is supposed to be that of holding in check the development of the sex organs during childhood. Pineal

Among the sex glands which furnish the secretions of reproduction is found a ductless gland which is extremely prominent today because of its rôle in rejuvenation treatments. Its removal in the male during youth results in unusual tallness, no change in voice, and beardless face. In such an adult there is lack of sex aggressiveness. Sex

C.—THE NERVOUS SYSTEM PROPER

We now come to the most difficult and complicated, and therefore the most significant and interesting part of the $S \longrightarrow A$ machinery, namely, the part that takes care of what happens after a stimulus has acted upon a sense organ and before the effects of the stimulation have reached their final goal in muscles and glands. This part consists of the nerves, spinal cord, and brain.

Structure of Nerves.—If we dissect the leg of a frog carefully we find a tiny white thread running down from the backbone to the muscle of its calf. This white thread is a nerve. If the nerve is placed under a microscope, we notice

that the thread is made up of thousands of thinner long threads, which are known as fibers, each fiber being about one-tenth the thickness of a human hair. Each fiber extends over the entire nerve from the spinal cord, where the nerve begins, to some muscle or to the surface of the body, where

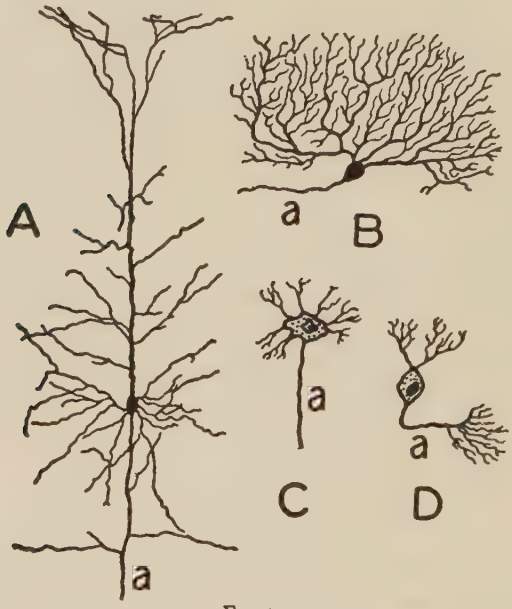


FIG. 7

Typical forms of neurons. "A" is a pyramidal cell from the cortex. "B" is a neuron from the cerebellum. "C" is a motor neuron from the spinal cord. "D" is a connecting neuron. The axon in each case is marked "a."

A nerve is a collection of fibers and cells

it ends. A further examination of the nerve reveals the fact that its fibers are branches or processes of cells, and that besides the one long fiber each cell also has a number of short branches. The thin long branch is called an axon and the short branches are known as dendrits. A single cell with its axon and dendrit is called a neuron. The neuron

is thus the structural unit of the nervous system, just as a brick is the structural unit of a building. All the nerve cells are collected together in one place, either in the spinal cord or in the brain. The neurons can intercommunicate with each other in all directions. The point of intercommunication between the neurons is called a synapse. We shall see later the significance of this bunching together in one place of the nerve cells.

The nerve fibers run either to a muscle or to a sense organ, supplying each little muscle fiber and each little sensory end-organ with a nerve fiber. Millions of nerve fibers collected into nerves thus span the body. In the nervous system there are thirty-one pairs of what are known as spinal nerves, meaning the nerves that run out of the spinal cord, one member of each pair running to a sense organ and the other to a muscle. In other words, at the entrance to the spinal cord each nerve divides into two roots, one root entering the cord at the dorsal side, the other at the ventral side. The root that connects the cord with the sense organs is the sensory nerve; the one that goes from the cord to the muscles is the motor nerve. The fibers of the motor nerve connect with the muscle fibers by end plates; those of the sensory nerve connect with the sense organs by end brushes. The two roots join together at a short distance from the cord and form the complete spinal nerve. The nerves receive their names from the region of the vertebral column from which they emerge, as follows:

Each nerve has two roots, connecting sense organ and muscle

8 cervical	neck region
12 thoracic	region of chest
5 lumbar	region of loins
5 sacral, 1 coccygeal	terminal portion of vertebral column

Besides the thirty-one pairs of spinal nerves, there are twelve pairs of cranial or cerebral nerves running off from the brain. Some of these nerves are made up of purely sensory fibers, others of purely motor fibers, and some contain both sensory and motor fibers. They emerge through holes in or between the bones forming the base of the skull. Their names with their functions are as follows: (s. indicating sensory, and m., motor)

Cranial nerves

I. Olfactory (s.), connected with the organ of smell
II. Optic (s.), connected with the organ of sight
III. Oculo-motor (m.), to certain muscles of the eyeball
IV. Trochlear or pathetic (m.), to a muscle of the eyeball
V. Trigeminal or trifacial (s., m.), sensory to face and tongue, motor to muscles of mastication
VI. Abducent (m.), to a muscle of the eyeball
VII. Facial (s., m.), sensory to tongue, motor to muscles of face
VIII. Auditory (s.), connected with the organ of hearing
IX. Glossopharyngeal (s., m.), to tongue and pharynx
X. Pneumogastric or vagus (s., m.), to the viscera
XI. Spinal accessory (m.), a portion joins the vagus, the other portion supplies two muscles of the neck
XII. Hypoglossal (m.), to muscles of the tongue

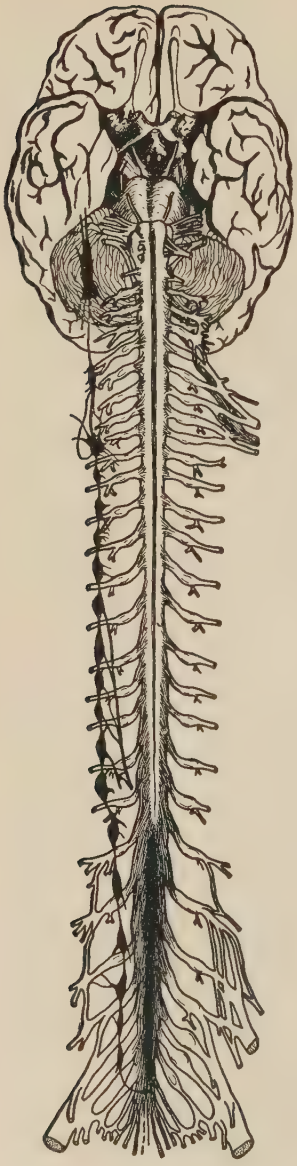
What Nerves Do and How They Do It.—If a nerve is taken out carefully from the leg of a frog, leaving a muscle attached to it, it will remain alive for a long time after its owner is dead, and it can be experimented upon for days. By remaining alive is meant that if the nerve is pinched or cut

the muscle will react—in the case of the frog, its leg will kick. If we take such an isolated live nerve, cut it at one end and connect an uninjured joint and the injured end to a delicate electrical measuring instrument known as a galvanometer, and the nerve is stimulated, the instrument indicates the presence of electrical changes. This means that a current or wave is passing through the nerve fibers. The nerve thus carries messages or impulses, and we are now quite certain that the wave which travels along the nerve is a wave of electro-chemical nature. That is, it is partly chemical and partly electrical. The nerve also grows hotter when it is stimulated, which indicates that it contains oxygen, that it breathes. The oxygen burns up foodstuffs which supply the nerve with energy that the waves traveling along the fibers must have. The presence of heat is a sign that a chemical change takes place when a message runs along a fiber and also as it recovers from its work.

A nerve fiber is a conductor of impulses

Another experiment shows how fast these messages travel. If a muscle-nerve is stimulated at two points, one point at a long distance from the muscle and the other very close to it, it reacts more quickly to the latter than to the former stimulation. If the distance between the two points is known, the speed of the message can be calculated. An electric shock is applied at some one point of a man's body and a measurement is made of the time that elapses between the application of the shock and his response to it. Then he is shocked at another point and the measurement of time is repeated. By this procedure it has been determined that in human nerves the message travels at a speed of about 400 feet per second, or about 280 miles per hour. Commenting on this fact, Pro-

The impulse travels rapidly



fessor A. V. Hill, to whose experiments we owe most of our best knowledge on the work of nerves, says:

> In human nerves they go about 400 feet per second, about 280 miles an hour. It is necessary that they should go fast: it is quite a long way from a man's toe up to his brain and back again. In the case of a very tall man it is about 4 yards, and if the message went only 2 yards a second (about the speed of a brisk walk) it would take such a man a second to think of taking his toe away when some one trod on it, and another second to do so. In the case of animals like giraffes, whales, and elephants, if the messages did not go very quickly along their nerves, it would occupy much too long a time for them to make the right response when anything awkward happened to them.[1]

The messages are carried away from the nerve cells by way of the axons; hence axons are *efferent* (carrying away) in function, while the dendrits receive the messages from the axones and carry them to the nerve cells. Dendrites are therefore *afferent* (carrying to) in func-

[1] *Op. cit.*, pp. 11-12.

FIG. 8
The Spinal Cord and the Brain

tion. The synapse is the point of junction between the axone of one neurone and the dendrites of another neurone.

The Spinal Cord and the Brain.—If every part of the body were connected *directly* with every other part by fibers, there would be as much confusion in the nervous system as would result if every subscriber to a telephone system in a large city were directly connected by a wire with every other subscriber. To obviate this confusion there is an exchange or switching mechanism where messages coming from all sensory stations in the body are received, regulated and sent on to their proper destination. This mechanism is the central nervous system, the great nerve center of the body.

The cord and brain are the great nerve centers of the body

In gross structure the central nervous system consists of the spinal cord and the brain. In minute structure, it is made up mainly of nerve fibers and nerve cells. The fibers are whitish in appearance, and the cells grayish. In the cord the cells lie in the inner portion, while the fibers ascend and descend on the outside. In the brain there are several well-defined structures of fibers and cells, all of them interconnected by other fibers and cells, and the whole connected with the cord, so that the complete system presents a unit of differentiated parts, each of which has some definite function to fulfill in the work of the system as a whole. The structures of the brain are the medulla, the cerebellum, the mid-brain, the thalamus, the pons and the cerebral cortex.

VI

THE WORK OF THE CENTRAL NERVOUS SYSTEM

There is always some danger of over-simplifying the functions performed by the central system from the standpoint

of psychology, but there is also the danger of evading the issue of the relationship between mental occurrences and nervous processes. We know that there is no muscular activity without some sort of nervous activity, and also that every mental occurrence is a nervous occurrence, since we have medical and experimental evidences that an injury or destruction of any certain part of the brain means a corresponding disturbance in some mental power. Hence we can say with certainty that mind is a function of the brain, although we cannot say with any degree of assurance just how this function is fulfilled. Just what it is that is happening in the brain as I am thinking at this moment we cannot say. But that something of a physical-chemical nature is happening is certain. Some day we may be able to write a formula for the brain operation of a thought. For the present we must be satisfied with the fact that where there is no brain activity there is no mental activity. And psychologically that is quite sufficient.

Mental phenomena occur somewhere and somehow in the brain

In order to see as clearly as possible what it is that the central nervous system does, and what light it throws on the subject matter of psychology, all we need to do is remind ourselves of the obvious fact that our activities, mental and muscular, are of two sorts. If I flash a light in your eyes, you blink; if I explode a bag behind your back, you jump. You do these things automatically whether you want to or not. Besides such forced movements, or movements not within our control, of which we have a large repertoire, we have a collection of movements which we perform voluntarily, over which we have control, but which are performed without any deliberate intent or conscious purpose on our part whenever some stimulus presents itself. All of us can

perform a large number of such small acts as moving the hands, fingers, legs, head, etc., at the very moment of birth and even before birth. Such acts form our native storehouse of behavior. The characteristic of such acts is that they constitute an immediate response, either mechanical or controlled, to a stimulus. But most of our reactions as adults, or at least those that are of most importance to us as social beings, are not of this direct, more or less machine-like nature. They have been learned, acquired. In these acts an interval of time elapsed, originally, between the presentation of the stimulus and the adequate reaction to it, the length of the time interval between stimulus and reaction varying from a fraction of a minute to hours, weeks, months, and even years. The scientist working in his laboratory may be confronted by some defect in his apparatus that may take him a moment or years to overcome. The reaction to the stimulus is delayed. We call all more or less immediate native reactions *reflexes*, while learned reactions are *habits*. Reflexes are native. Habits are acquired. The neural pathway for reflexes is congenital, inborn. For habits it is established by experience.

Our acts are either native or learned

Besides native muscular reactions, there are mental responses which are native possessions. We do not have to learn to see, hear, touch, smell, taste, feel pleasant or unpleasant, although we do have to learn what it is that we hear, touch, smell, taste, and what it is that makes us feel pleasant or unpleasant. Such immediate mental experiences as seeing, hearing, etc., we call *sensations*. The delayed responses of knowing what it is that is "sensed" are *perceptions*.

And so are our mental experiences

We have therefore two sorts of experience-reactions: immediate or native, and delayed or learned. Now what we want to find out from a study of the central nervous system is

three things: (1) Where is the bodily seat of native and learned experiences and reactions; (2) what is the relationship between the native and the learned, and (3) what is the relationship between experiences and reactions, or between mind and behavior? It is in the answer to the last two of these three questions that we are most interested from the standpoint of psychology, since here lies the key to what the subject matter of psychology must be, and therefore also to what the procedure is to be in the study of human nature.

Central nervous system is the key to psychology

VII

THE SEATS OF NATIVE EXPERIENCE-REACTIONS

a.—THE MECHANICAL EXPERIENCE-REACTIONS

The centers for such reflexes as the knee jerk, the lid reflex, and sensations like those of kinæsthesia and dizziness, are found in the cord, medulla, cerebellum, mid-brain, pons and thalamus.

The cord

The cord with its meshes of cells and fibers is the center for certain automatic rhythmic movements of arms and legs, and for reflexes such as the knee jerk, and flexion and extension. In such reflexes the cord can mediate without the help of the brain. They are therefore called spinal reflexes. If the spinal cord of a dog is cut across in the region of the neck so that there is no nerve connection between the cord and the brain, the animal will nevertheless scratch itself when the skin on its shoulders is tickled. This reflex can be provoked more readily under such conditions than when the cord is intact. If the head of a cat is removed in the laboratory for experimental purposes, the animal will scratch itself when

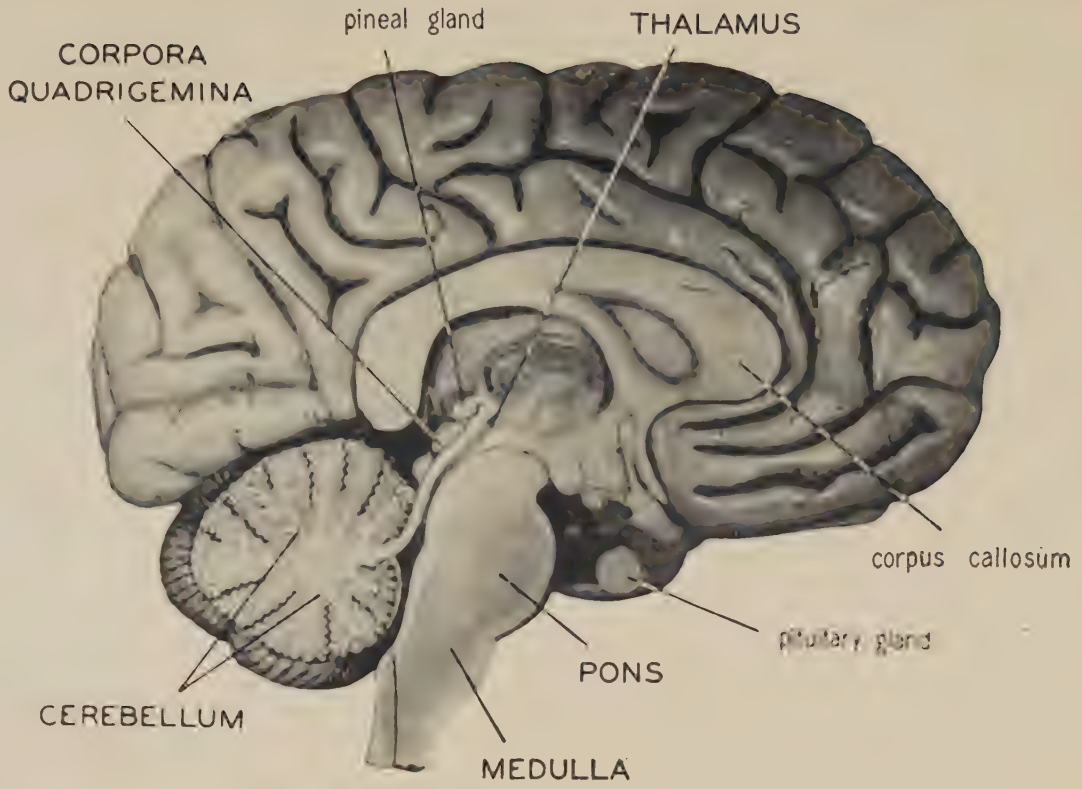


Fig. 9.—The Left Half of the Human Brain.

The large, convoluted mass, occupying more than half of the cranial cavity, is the cerebral cortex.

the skin of the neck is rubbed. In man there are similar reflex mechanisms present in the cord which operate independently of the higher centers, although the higher centers exert a controlling power over them, the nature of which we shall see later on.

The medulla is the bulb at the top of the cord. Its destruction results in speedy death. This is due to the fact that it contains nerve centers which control vital reflex functions, such as respiration and circulation. It is also the center for the movements of tongue muscles and those of the back of the throat that function in swallowing. Since the medulla produces an effect upon the work of such vital organs as the alimentary canal, heart, lungs, stomach, intestines—which means that it receives sensory and motor fibers from the visceral muscles—its psychological importance is great due to the influence of these organs on overt behavior. We shall see the importance of these organs when we come to describe emotion.

The medulla

The cerebellum lies at the back of, and above, the medulla. It is bound by many fibers to the medulla, pons and cerebrum. The total excision of the cerebellum results in complete loss of balance, while removal of one-half of it leads to abnormal muscular performances, such as unsteadiness, lack of muscular coördination, staggering gait and carriage. These phenomena indicate that its function is that of equilibrium and the maintenance of proper muscle tone.

The cerebellum

The mid-brain lies in front of, and slightly above the cerebellum. It receives sensory impulses from the eyes and ears and sends motor impulses to the face, eyes, and other parts of the body. It is involved in visual and auditory reflexes,

The mid-brain

and in those reflex movements that enable an animal to right itself after a fall.

The thalamus consists of two egg-shaped masses of gray matter or nerve centers. It lies in the very center of the brain. In function it seems to be closely associated with the cerebrum and cerebral cortex, as a relay station for sensory impulses. There is also evidence that it has something to do with feeling and emotion and is the center for visceral reflexes.

The thalamus

The pons consists of nerve fibers running from the gray matter within it to the cerebellum, and it receives fibers from the cerebrum. Consequently we may consider the pons as being a nervous pathway between the cerebral hemispheres and the cerebellum. The pons is also the center for reflexes of certain salivary glands, for movements of the muscles of the face, for eye movements, and for mastication.

The pons

b.—THE SEAT OF CONTROLLED NATIVE EXPERIENCE-REACTIONS: THE CEREBRUM

We now come to the structure in which are located the centers for the skeletal muscles and exteroceptors, namely, the cerebrum.

The cerebrum is a body of white and gray matter, the gray matter forming an outer layer or sheath, and therefore named the cerebral cortex. The cerebrum occupies about two-thirds of the cranial cavity and forms about one-half of the total weight of the brain. In the middle of the cerebrum there is a deep cleft or fissure dividing it completely into two parts or hemispheres in front and behind; but in the middle the fissure extends only for about half the depth, where the two hemispheres are connected by a large band of transverse

The cerebrum

fibers known as the corpus callosum. Besides this main fissure there are two other fissures, the fissure of Rolando and the fissure of Sylvius. The fissure of Rolando divides the front from the hind part, while the fissure of Sylvius lies chiefly on the lateral surface of the hemispheres.

The gray matter of the cerebrum is made up mainly of nerve cells, while the white matter consists of fibers running

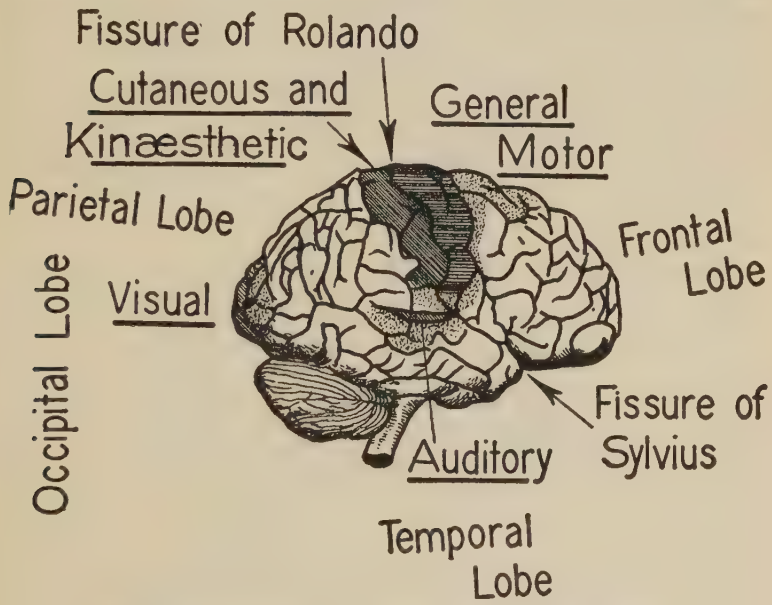


FIG. 10.—THE SENSORY AND MOTOR CENTERS OF THE CORTEX

in various directions. These fibers are of three kinds: (1) those that connect various symmetrical regions in the two hemispheres, called *commissural fibers*, (2) those that connect different regions in the same hemisphere, and make up the association tracts of the cerebral cortex and therefore called *association fibers*, (3) those that connect the cortex

The cortex

with the lower parts of the system, particularly the cord, called *projection fibers*. Since the cortex is mainly a body of cells, it is the one great and final terminal or nerve center of the entire nervous system. Fibers ascend to it and descend from it to other parts of the brain and to the lower sensory and motor nerve centers in the spinal cord. The entire center is divided into *projection* areas and *association* areas. The projection areas are the terminals for fibers ascending from and descending to lower sensory and motor centers of the central nervous system. The association areas are centers for fibers coming together from several projection centers. Hence the cortex is the principal central station for all the higher sensory-motor functions performed by the organism, as a whole.

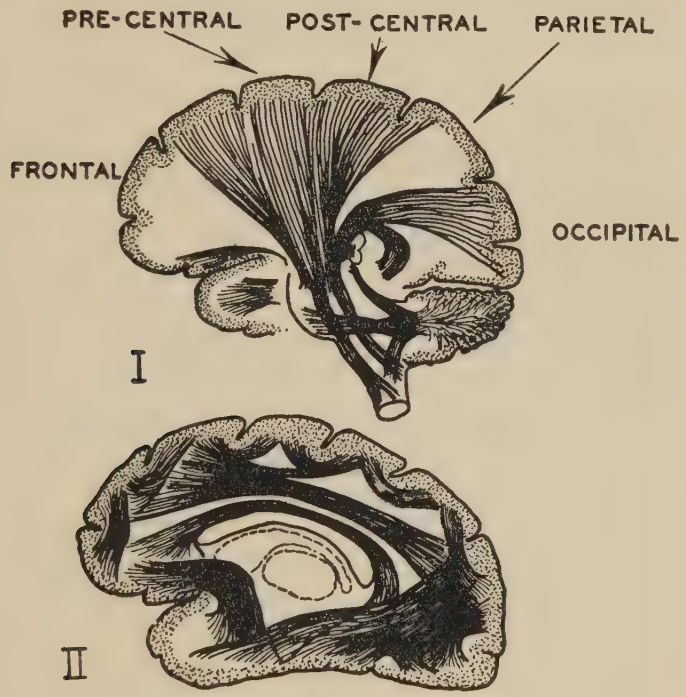
In front of the fissure of Rolando in the cerebral cortex are found the large nerve cells known as pyramidal cells; their axons or long fibers project down into the spinal cord where they communicate with the motor nerve cells of the spinal gray matter. The region of the pyramidal cells is known as the motor area of the cerebral cortex. Here simple movements of the skeletal muscles that control the limbs of the body are initiated. If some point in this area is stimulated electrically some muscle instantly acts. Stimulation of one portion moves the finger, another the wrist, and so on. By such experiments the specific functions of the different portions of this area have been quite definitely mapped out. At the top is the center for the legs, next for the trunk, next for the arms, and for the head, tongue, and mouth at the bottom.

The Motor Area

The sensation or sensory areas are scattered over the cerebral cortex, and their location is quite well known. These

areas receive fibers from the lower sensory centers of the other parts of the brain and spinal cord. The occipital area, or the

The sensory areas



The fiber system of the brain
I. The projection system of fibers.
II. The association system of fibers (after Starr).

FIG. 11

back portion, is the center for vision. The center for hearing is in the parietal or upper portion. The centers for touch and

kinæsthesia lie just beyond the Rolandic fissure, while those for smell and taste are in the inferior temporal or bottom area. Injury or absence of these areas results in the impairment or loss of corresponding sensations.

C.—THE SEAT OF LEARNED EXPERIENCE-REACTIONS

The network of fibers and cells, of conductors and exchanges, discussed above, provides the animal with the machinery for its native repertoire of activities. But where is the bodily seat of learned activities, of habits and perceptions?

Learning is recording and storing

"The ability to learn by experience," writes Professor G. Eliot Smith, "necessarily implies the development, somewhere in the brain, of a something which can act not only as a receptive organ for impressions of the senses and a means for securing that their influence will find expression in modifying behavior, but also serve in a sense as a recording apparatus for storing such impressions, so that they may be revived in memory at some future time in association with other impressions received simultaneously, the state of consciousness they evoked, and the response they called forth." [1] Now the cortical association areas are probably the seats for such recording and storing of impressions. The sensory and motor areas connect somewhat directly by means of ascending and descending fibers with some particular subcortical sensory or motor center. The principal characteristic of the cortical association areas is their freedom from domination by any one specific sensory-motor pattern. They therefore have no such specific functions to fulfill as do the sensory-motor areas. They are not dominated by any one system of

[1] Quoted in HERRICK, C. J., *Brains of Rats and Men*, University of Chicago Press, 1926, p. 193.

excitations. There are no native connections or pathways between them and any one sense organ or muscle. Messages come to them from all parts of the body inside and outside. Hence their function is general, namely, the regulation, control, and coördination of the legions of messages coming to them from all quarters of the body, outside and inside. They serve as the connecting links and arbiters between the sensory-motor areas, taking the native material of sensations and reflexes supplied to them and fashioning out of this elementary material more complex units of experiences and reactions—namely, percepts and habits—needed for the adequate complete adjustment of the animal to the complex situations it encounters. We may summarize the significance of these centers in the words of Professor Herrick:

Learning takes place in the association centers

> With advancing specialization in higher animals the lower primary reflex centers acquire more specific characteristics, and fixed systems of correlation fibers are laid down between them, thus establishing progressively more complex patterns of stable behavior. But the convergence and interplay of diverse sensory impulses and their interaction in determining the nature of the resulting movement is only moved farther back from the sensory surfaces. Progressively more complex correlation centers are elaborated in the mid-brain, thalamus, and cerebral cortex, and here the specificity of the sensory systems sooner or later disappears in a common meeting ground. The association centers of the human cerebral cortex present the final stage in this process. The absence of specificity or of physiological domination by any one sensori-motor behavior pattern is their most characteristic feature. Otherwise they would be incapable of performing the marvelous feats of recombination and reintegration of sensory experience which come to expression in intelligently directed behavior and in creative imagination.

We conclude that during the progress of vertebrate evolution

the complexity of stereotyped behavior patterns has increased and parallel with this the structure of the brain stem has been complicated by the fabrication of numerous specific reflex centers, all interrelated by well-insulated fiber tracts. This is the apparatus of routine behavior—immediate sensori-motor reactions. Now, if these numerous stabilized components of behavior are on occasion to be combined in unaccustomed ways or redirected to new ends—if, in short, the animal so generously endowed with reflexes and instincts is able to learn to do new things—then the switchboards into which all these processes are converged must be correspondingly enlarged.[1]

d.—SUMMARY OF BODILY BASIS OF EXPERIENCE-REACTIONS

We now can answer the three questions which led us to an examination of the nervous system.

In answer to our first question we find that the nervous system is the machinery for the $S \longrightarrow A$ process, in that it is the mechanism by means of which a stimulus arouses the animal to activity, to do something, and by means of which the doing of something in general gets to be the doing of something definite and specific suitable for meeting a definite situation. The doing of something *in general* consists of sensations and reflexes, of native responses and reactions, while the doing of something definite consists of percepts and habits, of learned responses and reactions.

The native is the basis for the acquired

In answer to the second question we see that the relationship between the native and the learned is that the native is the raw material for the learned. The number of possibilities for shaping the raw native material into finished learned products is immense. On this point we must again quote Professor Herrick. He writes:

[1] HERRICK, C. J., *op. cit.*, pp. 50-51. Reprinted by permission of the University of Chicago Press.

The known complexity of the lines of nervous conduction within even so simple a brain as that of a frog, if mapped out in detail, would make the wiring chart of the largest electrically driven factory look as simple as a country-road map. And if we turn to the human brain it is no exaggeration to say that a complete map of every circuit in all the telegraph and telephone lines of the North American continent would be incomparably simpler than such a chart of the nervous circuits of which we already have some knowledge. And the half of our nervous equipment has never been told.[1]

. . . . .

Every neuron of the cerebral cortex is enmeshed in a tangle of very fine nerve fibres of great complexity, some of which come from very remote parts. It is probably safe to say that the majority of the cortical neurons are directly or indirectly connected with every cortical field. This is the anatomical basis of cortical associational processes. The interconnections of these associational fibres form an anatomical mechanism which permits, during a train of cortical associations, numbers of different functional combinations of cortical neurons that far surpass any figures ever suggested by the astronomers in measuring the distances of stars. And in the cortical association centers it is the capacity for making this sort of combination and recombination of the nervous elements that determines the practical value of the system.[2]

. . . . .

Upon activation of the visual cortical field by the sight of the litter of the day's work upon my study table, associational processes are immediately set up within the cortex and each of the million excited cells of the visual area activates at least ten others, and each of these, in turn, ten others, and again on and on as long as the cortical process continues. And any particular cortical

[1] *Op. cit.*, p. 2. Reprinted by permission of the University of Chicago Press.

[2] *Ibid.*, p. 5. Reprinted by permission of the University of Chicago Press.

neuron may be repeatedly activated in different associational patterns, and the range of variety of these possible combinations cannot be exactly formulated in mathematical terms. For practical purposes it may be regarded as approaching infinity.[1]

. . . . .

During a few minutes of intense cortical activity the number of interneuronic connections actually made (counting also those that are activated more than once in different associational patterns) may well be as great as the total number of atoms in the solar system. Certainly not all anatomically present connections of nervous elements are ever used, but the *potentialities* of diversity of cortical associational combinations are practically unlimited, and the personal experience of the individual is probably an important factor in determining which of these possibilities will be actually realized.[2]

Mind and behavior are two aspects of one process

The answer to the third question, namely, the relationship of mind and behavior, or what we called more definitely experience and reaction, to neural processes is apparent. Mind and behavior are two aspects of one process. Mind, the inner or subjective, is one aspect of neural processes. Behavior, the outer or objective, is also the result of neural processes. The simple, limited behavior of the amœba is the result of its simple, limited neural organization. The complex, unlimited behavior of human beings is made possible by the possession of the most highly evolved and involved nerve structure. The difference between the adjustment to a situation made by a moron and a highly intelligent person is a difference in brain occurrences. The difference between an impulsive act that gets one in trouble and an act that follows deliberation

[1] *Ibid.*, p. 7. Reprinted by permission of the University of Chicago Press.

[2] *Ibid.*, p. 9. Reprinted by permission of the University of Chicago Press.

and meets with success is again a difference in neural occurrences. Mind and behavior are inseparable in operation. They are separated only for convenience of study.

VIII

SUMMARY

THE SYSTEMATIC APPROACH TO THE SUBJECT MATTER AND ANALYSIS OF HUMAN NATURE

We mentioned that the study of the nervous system is the key to a systematic approach to the subject matter and analysis of human nature. Analysis of human nature means the isolation of its elements and an examination of the rôle that each element plays in the $S \longrightarrow A$ process. And it is only the study of the nervous system that enables us to discover what these elements are, their respective functions, and how they interact. Let us therefore see what our examination of the nervous system tells us about the characteristics or traits of the experience-reaction process.

a.—CONDITIONS AFFECTING EXPERIENCE-REACTIONS

In any experience-reaction to a situation, two very readily observable factors are present. These are (1) that one and the same situation will evoke different activities in different persons, and (2) that one and the same situation will evoke different activities from one and the same person at different times. We call any influence which produces some effect upon the kind of response that is to be made to a situation a *motive*. A motive is a selective agent, an arbiter between a number of possible and probable adjustments to a situation.

Responses are affected by:

There are two such agents, past experience or angle of interest, and organic need.

1. Past experience

The best examples of how past experience influences and even determines present conduct are found in abnormal individuals. This does not mean that this motive operates only in abnormal cases, but only that here it stands out most clearly and is most obvious. When the psychiatrist examines a patient whose response to some situation is peculiar—let us say that he manifests some abnormal fear—his interest lies not so much in what happens in the present as in what occurred in the past. His concern is not with the present situation but with the past of his patient. The present situation does not determine the patient's behavior, it only arouses it. It was Dr. L. L. Thurstone who first called attention to the significance for normal psychology of this fact so obvious in abnormal psychology. The following account quoted from him indicates clearly what is meant by past experience as a motivating force in present behavior:

> The study of abnormal psychology radiates largely from the central question of discovering what satisfactions the patient is trying to attain, and how it comes about that he attempts to gain these satisfactions in the particular ways that we, as outsiders, consider to be ineffective and erratic. Our interest is in the patient, and we try to see his environment as it really looks to him. We discover, usually, that the satisfactions that the patient is trying to attain are universal for all of us, but we discover also that he is less successful than we are in using that environment.
>
> When we turn to normal psychology we have an entirely different state of affairs. No longer are we mainly interested in what the normal person is trying to do, and the satisfactions that he is trying to attain. On the contrary, we describe the normal person in scientific psychology as though he were nothing more than a

responding machine. In fact, the person who lends himself and his mind to the purposes of any experiment in a psychological laboratory is technically known as "the reagent" and everything that he does and says is technically known as his "responses" or "reactions." There is no fault to be found with this point of view for certain types of experimental work, but serious fault is to be found with the assumption that this point of view is at all adequate for psychology as a science.

In abnormal psychology we have, as I have said, the main emphasis placed on the patient and the exploration of his innermost self. His environment is looked upon merely as the means that happen to be available for him to satisfy his wants. We describe his erratic behaviour as the by-paths, substitutions, anomalies, and distortions that come about because of his repeated failure. We find that the patient is occasionally able so to distort his attitudes that he finds a compensatory kind of satisfaction in what seems to us queer conduct. He does attain satisfactions, however, even though he must distort his own attitudes toward life, his own sense organs and mental powers. Note that the cause-and-effect relations of such a psychological point of view start with the person himself, and that they terminate in the behaviour that satisfies him. This point of view reaches its most emphatic expression in psychoanalysis, and the fundamental truth about it that has been neglected in scientific psychology is that *action originates in the actor himself.*

When Jung's word-association test is given to a patient, the interest of the examiner is focussed on the patient in an attempt to learn what constitutes *his* desires, *his* failures, and *his* compromises with failure. But when we turn to the field of normal psychology, we find that in closely analogous experimentation the examiner is primarily interested in the *stimulus* and in the so-called *responses*, instead of in the *person*. The corresponding problems in normal psychology deal with the attempt to discover what fractional part of a second is required to perceive a word or to make a response, what particular arrangements in the stimulus facili-

tate or inhibit recall, and the effect that all sorts of variations in the stimulus can have on the response. The experimenter is then interested in describing the behaviour as in the nature of a response, and he attempts to describe the stimulus as the primary cause of the response. Normal psychology assumes that *action begins in the environment*, whereas abnormal psychology more often implies that *action begins in the actor himself*.[1]

2. Organic needs

The experience-reaction is also affected by the bodily state in which the animal finds itself at the time that a situation confronts it. Consider an assortment of foods placed before you, (a) when you are satiated, (b) when you are somewhat hungry, (c) when you are famished. Your behavior toward the food will differ for each of the three organic conditions. In (a) you will remain indifferent, in (b) you will be selective, but in (c) you will not only eat anything and everything before you, but you will go out in search of food. Even your past experience which taught you to like some foods and to dislike others has little if any effect upon what you do when exceedingly hungry. Organic needs, such as sex or hunger, are probably much more potent factors in determining behavior than past experience.

The seat of organic needs is the viscera

The topic of organic needs leads us back to a statement made in connection with the classification of stimuli into inner and outer, or bodily and non-bodily, namely, that the inner stimuli interact with the outer ones, and thereby affect each other. We may now see what this effect is. Organic needs are the work of visceral muscles whose reflex movements serve as stimuli that send messages to the central nervous system. In hunger, for instance, the contractions of the stom-

[1] THURSTONE, L. L., *The Nature of Intelligence,* Harcourt, Brace & Co., 1924, pp. xi-xiii.

ach muscles initiate a nerve current which, on being communicated to the brain, gives rise to the sensations that send us out in search of food.

All around, then, we note that experience-reactions are not determined solely by the situation, by what is present externally, but by the internal condition of the animal at the time the situation is presented, due either to its past experience or to its present organic state. Apparently the situation only serves as a release for the readiness of the animal to engage in some activity, either to remain in the condition in which it already finds itself, or to alter it.

Stimulus causes behavior but does not determine it

In the light of the above facts, our bare $S \longrightarrow A$ formula for life is now filled out to include not only response-reactions but also motives. This gives us:

$$S \longrightarrow M \longrightarrow ED \longrightarrow A,$$

or stimulus (situation) arousing an experience-reaction, the nature of which is determined by the predominant motive or motives at the time, resulting in some sort of adjustment to the situation.

b.—CHARACTERISTICS OF EXPERIENCE-REACTIONS

We now ask, what does the analysis of the mechanism of adjustment tell us regarding the specific subject matter of psychology and how its study is to be approached? Let us briefly review its main features.

The evolution of the nervous system is the evolution of mind and behavior

We found in the nervous system, with its accessory apparatus of sense organs and muscles, the sensory-neural-muscular basis of mind and behavior. The evolution and development of this mechanism means the appearance of increasingly higher forms of mind and behavior in the evolution of animal species in general and in the development of the

child in particular. This structure consists of millions upon millions of cells and their processes, constituting a delicate and intricate network for the transmission, switching, regulating and coördinating of nerve currents. The combinations that are made possible by the interconnections of this network in man are limitless, which means that man is capable of developing new ideas and new forms of behavior far beyond his present range. Because of this structure of the nervous system, no limit is placed upon man's intellectual attainments.

In its developed form this system consists (1) of a receptor portion of sense organs, tuned to various types of inner and outer events; (2) of an effector portion of muscles and glands ready to go into action on orders from (3) a central portion of nerve centers which sort, guide and coördinate messages coming to them from (4) the connecting portion of nerves. The central portion, or the central nervous system of spinal cord and brain, is the field of psychology. Psychology is mainly concerned with what goes on in this portion, particularly in the cerebrum. Here it finds the seat of mind and consequently also of behavior, although, as we have already noted, mind is greatly affected by the visceral muscles and glands. Each part of this system has certain functions to fulfil in the building up of mind. The spinal cord looks mainly after the simpler reflex activities. The medulla is the seat for the control of breathing and circulation. The cerebellum looks after the coördination of most of the incoming and outgoing messages for balance and maintenance of posture. These parts work unconsciously and are only of secondary interest to psychology. It is that portion of the brain in which true conscious processes occur, namely, the cerebrum, that mainly attracts psychology.

Psychology interested in the central nervous system

The essential part of this organ consists of millions upon millions of nerve cells, each with a large number of branches, so that in all probability any cell can be connected comparatively readily with other cells. Different regions, each comprising large numbers of cells, are associated with different functions and different psychic processes. In all probability, again, every conscious process is associated with the activity not of one, but of a great many cortical cells acting simultaneously.

It has many functions

The complex processes occurring in the cerebrum are probably extensions and elaborations of the simple reflex circuit. When an impulse coming from a sensory nerve fibre reaches some reflex center it may pass directly to a motor fibre and thence to a muscle or muscles, resulting in an immediate act. Or it may pass on to a higher center, in which case the reflex circuit is interrupted and the reaction to the stimulus is therefore delayed. A high degree of consciousness seems to be possible only where there is this gap between stimulus and reaction, which means that a great number of connected cells are excited at one instant of time resulting in forms of behavior above the reflex.

Levels of neural activity are levels of mind and behavior

Here, then, is the key to the subject matter and mode of procedure for the study of human nature. The subject matter consists of levels of adjustment from those mediated by the reflex centers to those evolved in the carpet of interlacing fibres and cells which form the cerebrum, while the mode of procedure is to trace the development of behavior and mind from the simple to the complex.

These levels are the subject matter of psychology

If we now give the name *intelligence* to what we have thus far variously called awareness, consciousness, mind, mental activity, experience, we may define intelligence as *delayed be-*

havior. The degree of delay means the degree of intelligence. Man is most capable of delayed behavior or, as we commonly say, of deliberated, thought-out, reasoned-out behavior, and he is therefore the most intelligent of animals. The evolution of behavior from the simple, immediate, automatic reflex of an insect to the delayed behavior of the scientist working for several years on a theory, is also the evolution of intelligence. Intelligence is preparatory behavior. What we call thinking, reasoning, deliberating, are all behavior in the making. Every momentary mental activity is an unfinished act, a preparatory act which ultimately becomes a component part in the final overt consummatory adjustment.

Intelligence is delayed behavior

From the above consideration it must now be clear that the analysis of human nature upon which we are to engage, reduces itself to tracing the growth of intelligence and behavior in the human being from its simplest manifestation to its most complex forms. Intelligence begins with sensations, proceeds to perception and culminates in imagination. Behavior begins with reflexes, proceeds to habit, and culminates in voluntary action. But as we have seen in our attempt to define psychology, mind can only be studied in terms of behavior. Hence our analysis of human nature must begin with behavior.

Business of psychology is to trace intelligence and behavior from simple to complex

PART TWO

The Nature of Behavior, in General, and Its Development from the Reflex to Voluntary Action

¶ In this section we shall study the general nature of animal behavior, its simple beginnings in the native, inborn reflexes, and how these simple reflexes are developed into habits and controlled voluntary acts. We shall see what advantages human beings have over other living organisms, the important rôle that habits and voluntary acts play in human life, and how they make or break us.

CHAPTER IV

REFLEXES

Questions this chapter seeks to answer: What is behavior? What is the most elementary form of behavior? Why are reflexes significant? What are some of the traits of reflexes and what do these traits signify? What reflexes do human beings possess?

I

The Nature of Behavior

It will be well to open the analysis of behavior with a brief account of what behavior is, as a whole. We recognize two kinds of action or movement, one of which we designate as motion and the other as behavior. What is the difference between them?

Consider a man and a rock rolling down a steep incline. Both are in motion. Both are being pulled by an external force. But when we say that the rock is in motion we have said everything. When we say the man is in motion we have told but a small fraction of what is happening. Besides being in motion, the man engages in activities which are *due to the motion*, which the motion initiated, and which have a relationship to the motion, but which are not a *part of the motion* since they are not controlled by the force to which the motion is due. The activities referred to are the movements

Motion is external, behavior is internal

of hands, feet, twistings of body, and so forth. The energy that makes these movements possible comes from within the organisms.

Motion is passive, behavior is active. The rock is being acted upon, but the man, in addition to being acted upon, also acts upon. The man resists the pull of gravity; the rock is completely ruled by it, with the exception that its size, shape, weight, friction, and the angle of the incline have an effect upon its motion. "Even a dead fish can swim with the current, it takes a live one to swim against it," is a saying that illustrates this point. Push and pull are sufficient to describe motion. To describe behavior we must add active resistance to the push and pull. A man jostled in a crowd engages in both motion and behavior, whereas the atoms in a molecule or the planets in the solar system are just in motion.

Motion is passive, while behavior is active

Motion is accidental, haphazard, while behavior is adaptive. It has a purpose. Whatever happens to the rolling stone is determined by the circumstances or conditions under which it is moving. The man, on the other hand, while he is in motion, engages in activities in which purpose or an end to be achieved is discernible. The purpose is to adapt himself to the situation as a whole, or to some specific aspect of the situation. As he is rolling he attempts to stop himself, that is, to revert to his normal state. In addition to the general purpose of his activities, there may be several other purposes present as, for instance, to evade a muddy spot in his way, a deep hole, or a sharp rock. In all of living nature this adaptation of means to ends is to be found. We even find purpose present in physiological processes. In the study of the physiology and anatomy of muscular and circulatory systems we find not only the contractile processes by which energy is liberated,

There is purpose in behavior

and which can be attributed to physical and chemical occurrences, but also purposeful adjustments for which no laws of chance can account. Still more significant is the fact that an animal is able to adjust itself to changes in its environment. An automobile running without a driver may be wrecked by an obstruction in the road, while a dog will get around it. Chance controls the motion of the machine, but it only modifies the behavior of an animal. By purpose here is simply meant the persistence of an activity toward some recognized or discernible end. Thus, in order to describe the behavior of a rat in a maze, we find it necessary to refer to an end-object toward which or away from which its behavior is directed. Its behavior is an indication of a persistent effort to get away from where it is and to reach a place where it wants to be. Whenever we feel that the animal not only strives toward some end, but is also aware of the end to be accomplished, we speak of *purposeful* behavior. When we have no reason for believing that the end to be attained is present to the animal, we refer to the behavior as *purposive*. The nest-building of the bird is probably purposive. Studying the psychology assignment is undoubtedly purposeful, since if the end to be achieved were not known to the person, the activity would not be engaged in. We may say that purpose is present whenever the activities of an animal come to an end as soon as they have brought about a particular change in its state of being. In other words, whenever we judge that the animal's activity seems to be in some degree a preparation for, or any anticipation of, a new situation which will bring the activity to an end or which will set up a new kind of activity, purpose is present.

Motion is predictable, behavior is unpredictable. The pres-

ence of purpose in behavior leads us to recognize another trait in behavior which is absent in motion. There is always an element of unpredictability present in the ways of almost all living creatures. The unexpected not only happens often, but it is even safer to predict the unexpected than the expected. Professor J. Arthur Thomson says: "There are indeed uniformities of sequence in the reactions of organisms, otherwise no science of behavior were possible, but there is an undeniable appearance of free agency. . . . Only in the realm of organisms is there true behavior—in which the creature is an agent and exhibits a correlated or concatenated series of acts, effective towards some definite result, favourable to the continuance and harmony of vital process." [1] This inability to tell "which way the cat will jump" is due to the presence of purpose. We can predict what a machine will do simply because it has no purpose and hence does not adapt means toward an end. But we cannot predict, we can only guess, what an animal will do, specifically, unless we know what it is after. If we know its purpose we may surmise what means it is liable to adopt to achieve its end, but even at that the prediction is nothing but a good guess. At least we must experiment with it for some time, setting it one specific objective or problem, such as the obtaining of food, in order to find out what it is liable to do. We can say that if the rat is very hungry he will do either this or that or the other thing. But if the kind of food is changed, or the organic condition of the animal is modified, then what we discovered to be generally true for the previous state will no longer hold for the present condition. One writer puts the whole matter succinctly as follows:

Behavior is free

[1] *The System of Animate Nature,* Holt, 1920, vol. i, p. 176.

The laws of mechanics predict with exactitude what the stone will do when it is kicked. But no laws of mechanics can predict what my hundred and thirty-five pounds of flesh will do after it has landed on the stone. You have to know my character, my disposition, my past acts, my present state of mind, my consideration for the proprieties of the circumstance, or lack of appreciation of the proprieties, in order to predict my subsequent action.

Neither will any chemistry or physiology of my structure enable you to predict whether I will swear, laugh, act humiliated, or appear unconcerned. Whatever I do will, of course, be in accordance with the laws of mechanics, of bio-chemistry, and of physiology, but not predictable by those laws. For I act in accordance with those laws whether I weep or cry, sue the city council, or solemnly resolve to remove all loose stones so that no other citizen be injured here by falling on a loose stone.[1]

Motion is invariable, behavior is variable. Under the same conditions motion remains constant when repeated, no matter how often, but behavior is modified by past experience. In behavior the past becomes a part of the present, and the present is assimilated into the future. Under similar circumstances the behavior improves in effectiveness when repeated. Professor Thomson presents this trait of behavior as follows:

Behavior is influenced by past experience

A fact of great interest has been established by Professor Jennings, that the behaviour of unicellular organisms is modifiable by experience. He has experimented, for instance, with a trumpet-shaped ciliated Infusorian called Stentor which abounds in marshy pools, attaching itself by the narrow end to a water-weed, and surrounding the lower half of its body with a mucus-like sheath, the so-called tube. A cloud of carmine particles is introduced into the water-currents passing to the ciliated mouth of the Stentor. It bends to the aboral side, twisting on its stalk two or three times as it bends, and thus often avoids the cloud of par-

[1] WALLIS, W. D., "Is Purpose Only Mechanism Imperfectly Understood?" *Journal of Philosophy*, vol. xxii, No. 4, pp. 95-96.

ticles. That is answer one. But if the particles continue to come, the ciliary movement is suddenly reversed and the water is driven away from the mouth. This may be repeated two or three times, and is answer two. If the Stentor does not get rid of the obnoxious stimulation in either of these two ways, it contracts into its tube and suspends activity, this being answer three. After half a minute or so it re-expands, and if the carmine particles still reach it, it contracts again. It will do this many times, and after each contraction it stays a little longer in its tube than it did before. Finally, if no improvement in circumstances rewards its trials, it breaks its attachment and swims forwards or backwards away from its tube. And this is answer four. "The stimulus and other external conditions remaining the same, the organism responds by a series of reactions becoming of more and more pronounced character, until by one of them it rids itself of the stimulation" (p. 176). "The same individual does not always behave . . . in the same way under the same external conditions, but the behaviour depends upon the physiological condition of the animal. The reaction to any given stimulus is modified by the past experience of the animal, and the modifications are regulatory, not haphazard, in character. The phenomena are thus similar to those shown in the 'learning' of higher organisms, save that the modifications depend upon less complex relations and last a shorter time" (p. 179). Our view of living creatures must make room for the new fact that behaviour reaches this level among the unicellulars.

Among unicellulars, then, we see the beginning of exploring and testing, the beginning of actual "hunting," and this is on the main line of advance. We see, also, the enregistration of particular reactions to stimuli, an organization of behaviour that is economical and in its rapidity of response often life-saving. But we see, also, a selection of reactions, a trying of one after the other till haply one meets the needs of the case, and this "trial-and-error" method is likewise on the main line of advance.[1]

[1] *Op. cit.*, pp. 184-185.

Motion is destined, behavior is free. The five traits of behavior described above shed an illuminating ray of light upon the age-old philosophical problem of free will versus determinism. Since it is only psychology that can truly deal with this problem, it is not out of place to consider it here.

The answer to the problem, if there is an answer, must be relative and cannot be absolute. Absolute freedom would be no freedom at all, since unless one meets with obstruction and hindrances he will never know he is free. The positive cannot exist without the negative. If freedom means degree and extent of possibility for choice in action, then an organism is free as compared with a machine. An animal, even at the lowest scale of life, is not as destined to respond in a certain specific manner to some specific situation as is a machine. There is always an element of indeterminism in behavior, and this element increases in scope as we ascend the scale of life. Man is the freest of organisms because possibilities for different responses to one situation are widest in scope. The animal is always somewhat of an agent, and never a mere mechanism. We must again quote Professor Thomson on this point.

There is "will" in behavior

As we ascend the scale of being, there is a growing amount of experimental indeterminism. An organism is free as compared with a not-living system. When we begin experimenting with a starfish, we cannot tell what it will do in the various situations in which we place it, but after we have experimented for a long time we can tell what the starfish we have worked with will do under certain circumstances, provided always that we know its "physiological condition." For a hungry animal does not behave as a full-fed one does. But when we are rash enough to make a prediction in regard to the behaviour of a fresh starfish, of the

same kind and weight and size, we are very likely to be very far wrong. Why is this? It is otherwise in the inorganic world, where we can safely argue from one thing to another thing of the same kind. The difference is not one of complexity, but of kind. The starfish is not mechanically necessitated to act as it does; it often checkmates mechanism. Even when we say that it is coerced by its own brainless constitution we must remember that it was itself in some degree an agent in establishing that constitution.

Similarly, an animal with a big brain, *i.e.*, a well-developed capacity for intelligent behaviour, is free compared with a starfish. By careful study we may reduce the experimental indeterminism and predict with some success what our dog will do in a particular situation. But we are likely to make a bigger mistake than we made with our starfishes if we argue from our dog to our neighbour's. For why, the individuality of the dog is so much greater than that of the starfish. The details of its behaviour are determined much less by its general constitution and much more by the character which it has itself been an agent in building up. Thus we see in the realm of organisms a ladder of emancipation—the evolution of free-will.

The impression which we get from the study of even starfishes seems to us to hold for the whole realm of Animate Nature and for ourselves in it. We find neither systems of absolute determinism nor "miscellanies of miracles," but systems in which determinism and freedom are both illustrated, sometimes more of the one and sometimes more of the other. The enregistrations within an organism limit its actions within certain trammels; the reflexes, the tropisms, the instincts, the hereditary appetites are all determinist in effect; but our conception of the typical organism is not complete unless we recognise its possibilities of initiative and experiment, of trial and error, or choice and control. Perhaps we may profitably continue into the realms of ethics and religion this compromise between determinist and free-will interpretations which biology suggests.[1]

[1] *Op. cit.*, pp. 220-222.

II

THE NATURE OF REFLEXES

The most elemental form of behavior is the reflex. The presence of a reflex is an indication of the existence of life. The reflex is the point of demarcation between the organic and the inorganic, between life and matter. Where there are reflexes there is life. The lowest forms of life exist mainly by their reflexes, while the human infant, although it later develops other forms of behavior, has nothing at birth but reflexes. Structurally, or from the standpoint of what happens in the nervous system, a reflex is the most direct neural pathway from a sense organ to a muscle. Functionally, or from the standpoint of what work it performs, a reflex is a spontaneous, automatic reaction to a stimulus, an immediate adjustment to a situation. It is a uniform reaction to a particular kind of inner or outer stimulus. All animals of the same kind exhibit approximately the same reflexes in the same way. Hence reflexes are independent of individual experience. The neural linkages and correlations are established before birth. In higher animals, the brain, particularly the cortex, may and does exercise a regulating and controlling power over reflexes. But this center is not necessary for reflex activities.

Reflexes are the beginning of behavior

Reflexes have a survival value in that they protect the vital organs and the limbs of the body from external harm and danger. When one's finger comes into contact with a hot object there is not time for deliberation before the finger may be injured. Deliberation may be indulged in after the finger is safe. What is most urgently needed in such a situation is a

They have a biological function

current which, rushing immediately from the sense organ in the skin to the muscles of the endangered finger, causes it to be withdrawn. And that is what happens. The action of the muscle in withdrawing the finger sends a current to the brain, and this process is responsible for the individual's becoming aware of what has happened, and for his attendant resolution for future caution. But this is an after effect. It represents a higher degree of consciousness than that involved in the reflex itself, and exists only in the highest forms of life. Only organisms having highly evolved nervous structures are capable of *foresight* and even these do not always use it.

Experiments on reflexes from amœba to man have revealed certain traits that are not only of general interest as phenomena of behavior but which have a special psychological importance in suggesting how larger and higher units of behavior grow out of these elementary units.

We have seen above that reflexes are native or inborn structural linkages of particular sensory neurons and particular motor neurons forming a reflex arc. Probably no simple reflex arc ever functions alone, but involves many other arcs. Even the behavior of such a simple organism as the sea urchin, which has no nerve ganglia, consists of a "republic of reflexes." Its reflex arcs are so arranged that a stimulus will set them off simultaneously, resulting in a definite general action such as crawling. Thus the independent course of the reflexes produces a unit of behavior just as if there were a common center for coördination. Furthermore, the reflex is affected by past experience even in the simplest organisms. A sea anemone that has been deceived a number of times with false food stops taking it. Professor Jennings

Reflexes are not "wooden"

found that one of these simple organisms, known as Metridiuni, eats meat but will not take bits of filter paper. A certain species of sea anemone that lives in crevices between stones will assume a novel position if it is touched too often and may even release its foothold and move to a safer region. These instances indicate that past happenings influence present behavior, even in reflexes. What is done now depends on

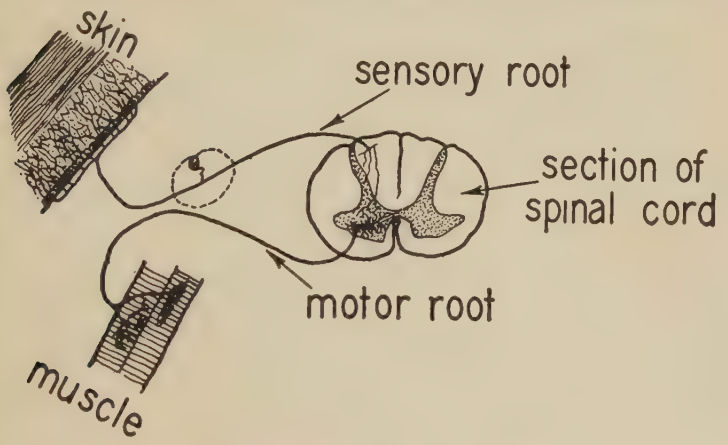


FIG. 12.—THE NEURAL BASIS OF A REFLEX

A sensory fiber carries an impulse from some sense organ, makes a synaptic connection in the gray matter of the spinal cord with a motor fiber which carries the impulse to some muscle or gland. Such an arrangement is known as a reflex arc or a reflex circuit. The reflex arc is thus the functional unit of the nervous system, which means that it is the simplest arrangement for the transmission of an impulse from a receptor to an effector. Even the simplest reflex act, however, involves a large number of reflex arcs working together.

what occurred on former occasions, whether externally in the stimulus or internally in the organism itself. Reflex behavior is thus not stereotyped. Even tentative exploratory movements may be detected. Professor Preyer experimented with a brittle starfish. He slipped a rubber tube over one of its arms and counted five different ways in which it was

removed. In one case it even surrendered the arm to rid itself of the encumbrance. If one method did not succeed another was used. Other experiments with starfish show learning by trial and error where the number of useless movements decreases with repeated experience. Professor Thomson says:

> One of the clearest results of the modern study of the behaviour of the lower animals is that the kind of action depends greatly on the physiological state as a whole, which, again, depends in part on history and experience. That experience can be enregistered in organisms with the simplest of nervous systems or with none is certain. Two individual Planarias (small ciliated freshwater worms) often react in opposite ways to the same stimulus. What they do varies with their appetite, their freshness or fatigue, their recent stimulation and degree of excitement, and their history. After long study of Planaria, Professor Pearl concludes that "it is almost an absolute necessity that a person should become familiar, or, perhaps better, intimate, with an organism, so that he knows it in something the same way that he knows a person, before he can hope to get even an approximation of the truth regarding its behaviour" (quoted by Jennings, 1906, p. 254).
>
> If a reflex be an invariable reaction to a given stimulus, then there is much more than that in the behaviour of lower animals. For different answers to the same stimulus may be given by the same kind of creature or by the same creature at different times. The answer depends on the organismal condition as a whole. Moreover, the fact that stands out most clearly in the behaviour of the lower organisms is this:—"Each stimulus causes as a rule not merely a single definite action that may be called a reflex, but a series of 'trial' movements, of the most diverse character, and including at times practically all the movements of which the animal is capable" (Jennings, 1906, p. 280).[1]

[1] *Op. cit.*, pp. 191-192.

For some twenty-five years a Russian physiologist, I. P. Pavlov, has been experimenting with what is now known as the conditioned reflex. Pavlov found that a reflex could be evoked by a stimulus originally ineffective, provided that it occurred several times simultaneously with the originally effective stimulus. If the experimenter signaled the approach of food to a dog by the repetition of some sound, as the ticking of a metronome, and repeated this procedure several times, the animal began to associate the sound with the food. On hearing the sound alone, the dog would turn in the direction of the sound and lick his lips vigorously. Thus the scope of the reflex was extended to include a new stimulus. The reflex is the same, but it is evoked in a new way. From the point of view of the nervous system, a new neural process has occurred, probably involving the brain cortex. The reflex has been amplified, raised to a higher level or, in other words, the behavior has become more complex. Further experiments with this conditioned reflex revealed other complications. If another person besides the experimenter were present in the room, the reflex ceased to operate. Something inhibited it, and this something must be some neural process set up by the presence of the stranger. Some organic conditions would also inhibit the reflex. Inhibition, like excitation, is facilitated by repetition. All these modifications of the original automatic reflex mean cortical activity. That is, to the original neural process occurring in the reflex other processes are added by external and internal conditions. The simple becomes the complex: new forms of behavior are built out of old established forms, and the new forms are of a higher kind than the old. These higher units of behavior are the result of training, with the native unit for their basis.

Conditioned reflexes in animals

Dr. John Watson has studied conditioned reactions in children and thereby has made one of the greatest contributions up to date to an understanding of the laws that control the development of human behavior. A sudden noise will cause an infant to jump, start, cry and display other reflexes that are the usual signs of fear. A sudden noise and loss of support are the only natural stimuli which will call forth fear reactions. How, then, do human beings acquire their large stock of fears? Here is an experiment of Dr. Watson's which answers the question:

Conditioned reactions in human beings

Our first experiment with Albert had for its object the conditioning of a fear response to a white rat. We first showed by repeated tests that nothing but loud sounds and removal of support would bring out fear response in this child. Everything coming within twelve inches of him was reached for and manipulated. His reaction, however, to a loud sound was characteristic of what occurs with most children. A steel bar about one inch in diameter and three feet long, when struck with a carpenter's hammer, produced the most marked kind of reaction.

Our laboratory notes showing the progress in establishing a conditioned emotional response are given here in full:

> Eleven months, three days old. (1) White rat which he played with for weeks was suddenly taken from the basket (the usual routine) and presented to Albert. He began to reach for rat with left hand. Just as his hand touched the animal the bar was struck immediately behind his head. The infant jumped violently and fell forward, burying his face in the mattress. He did not cry, however.
>
> (2) Just as his right hand touched the rat the bar was again struck. Again the infant jumped violently, fell forward and began to whimper.

On account of his disturbed condition no further tests were made for one week.

Eleven months, ten days old. (1) Rat presented suddenly without sound. There was steady fixation but no tendency at first to reach for it. The rat was then placed nearer, whereupon tentative reaching movements began with the right hand. When the rat nosed the infant's left hand the hand was immediately withdrawn. He started to reach for the head of the animal with the forefinger of his left hand but withdrew it suddenly before contact. It is thus seen that the two joint stimulations given last week were not without effect. He was tested with his blocks immediately afterwards to see if they shared in the process of conditioning. He began immediately to pick them up, dropping them and pounding them, etc. In the remainder of the tests the blocks were given frequently to quiet him and to test his general emotional state. They were always removed from sight when the process of conditioning was under way.

(2) Combined stimulation with rat and sound. Started, then fell over immediately to right side. No crying.

(3) Combined stimulation. Fell to right side and rested on hands with head turned from rat. No crying.

(4) Combined stimulation. Same reaction.

(5) Rat suddenly presented alone. Puckered face, whimpered and withdrew body sharply to left.

(6) Combined stimulation. Fell over immediately to right side and began to whimper.

(7) Combined stimulation. Started violently and cried but did not fall over.

(8) Rat alone. The instant the rat was shown the baby began to cry. Almost instantly he turned sharply to the left, fell over, raised himself on all fours and began to crawl away so rapidly that he was caught with difficulty before he reached the edge of the mattress.

Before the above experiment on the rat was made, Albert had been playing for weeks with rabbits, pigeons, fur muffs, the hair of the attendants and false faces. What effect will conditioning

him upon the rat have upon his response to these animals and other objects when next he sees them? To test this we made no further experiments upon him for five days. That is, during this five-day period he was not allowed to see any of the above objects. At the end of the sixth day we again tested him, first with the rat, to see if the conditioned fear response to it had carried over. Our notes are as follows:

> Eleven months, fifteen days old. (1) Tested first with blocks. He reached readily for them, playing with them as usual. This shows that there has been no general transfer to the room, table, blocks, etc.
>
> (2) Rat alone. Whimpered immediately, withdrew right hand and turned head and trunk away.
>
> (3) Blocks again offered. Played with them, smiling and gurgling.
>
> (4) Rat alone. Leaned over to the left side as far away from the rat as possible, then fell over, getting up on all fours and scurrying away as rapidly as possible.
>
> (5) Blocks again offered. Reached immediately for them, smiling and laughing as before.

This shows that the conditioned response was carried over the five-day period. Next we presented in order, a rabbit, a dog, a seal-skin coat, cotton, wool, human hair and a false face:

> (6) Rabbit alone. A rabbit was suddenly placed on the mattress in front of him. The reaction was pronounced. Negative responses began at once. He leaned as far away from the animal as possible, whimpered, then burst into tears. When the rabbit was placed in contact with him he buried his face in the mattress, then got up on all fours and crawled away, crying as he went. This was a most convincing test.
>
> (7) The blocks were next given to him, after an interval. He played with them as before. It was observed by four

people that he played far more energetically with them than ever before. The blocks were raised high over his head and slammed down with a great deal of force.

(8) Dog alone. The dog did not produce as violent a reaction as the rabbit. The moment fixation of the eyes occurred, the child shrank back; and as the animal came nearer he attempted to get on all fours but did not cry at first. As soon as the dog passed out of his range of vision he became quiet. The dog was then made to approach the infant's head (he was lying down at the moment). Albert straightened up immediately, fell over to the opposite side and turned his head away. He then began to cry.

(9) Blocks were again presented. He began immediately to play with them.

(10) Fur coat (seal). Withdrew immediately to the left side and began to fret. Coat put close to him on the left side, he turned immediately, began to cry and tried to crawl away on all fours.

(11) Cotton wool. The wool was presented in a paper package. At the ends the cotton was not covered by the paper. It was placed first on his feet. He kicked it away but did not touch it with his hands. When his hand was laid on the wool he immediately withdrew it but did not show the shock that the animals or fur coat produced in him. He then began to play with the paper, avoiding contact with the wool itself. Before the hour was up, however, he lost some of his negativism to the wool.

(12) Just in play W, who had made the experiments, put his head down to see if Albert would play with his hair. Albert was completely negative. The other two observers did the same thing. He began immediately to play with their hair. A Santa Claus mask was then brought and presented to Albert. He was again pronouncedly negative, although on all previous occasions he had played with it.[1]

[1] *The Pedagogical Seminary*, vol. xxxii, no. 2, pp. 342-345.

III

THE PSYCHOLOGICAL SIGNIFICANCE OF REFLEXES

From these traits of reflexes we readily recognize the great psychological significance of these native units of behavior. Psychologically, reflexes are the building blocks or units of behavior. They are the atoms of its structure; they are to behavior what cells are to the body. The evolution of the body from that of the amœba to that of man is an increase in the number, differentiation, and specialization of cells. Likewise the evolution of behavior is a gradual increase in the complexity as well as in the functioning of reflexes. All the forms of behavior engaged in by an adult grow out of the raw material of the reflexes present at birth. The psychologist studies reflexes for the same purpose that the chemist investigates the structure of matter. The more he learns about the ingredients of compounds the greater is his control over them; he can either make them, unmake them, or produce new ones. As we increase our knowledge of reflexes and of how they combine to form higher units of behavior, our ability to control behavior also increases.

Reflexes are the building blocks of behavior

In conditioned reactions we have a key to the origin of many peculiarities of human behavior, eccentricities, delusions, phobias—what Freud calls the psychopathologies of everyday life. They are conditioned behavior established most usually in early childhood; and since the original causes are not apparent, the acts themselves have an appearance of mystery. The Freudian concepts of subconsciousness, repression, complexes, etc., the mysterious flavor of which has endeared them to a large public, are revealed in their cold naked state

Many peculiarities of behavior are conditioned reactions

by the principle of conditioning. A young child cries every time it is placed in a certain room in the house. It has a mysterious fear of the room! What had happened? While lying in bed one day, one of the window curtains snapped up suddenly, producing a loud noise, and caused the child to cry. A conditioned reaction was set up by the curtain or window becoming associated with the primary effective stimulus, the sudden noise. After this experience, whenever the child was brought into the room its gaze immediately wandered to the window and it began to cry. The application of the law of conditioned behavior would remove a horde of poisonous superstitions and rationalizations with which "human nature" is honeycombed.

IV

Inventory of Human Reflexes

The repertoire of reflexes with which the human being comes into the world and out of which there gradually emerges that mass of more complex forms of behavior which enables the growing child to cope adequately with its varied surroundings is as follows:[1]

A. Purest—least subject to central modification in adult

"Pupillary" or iris reflex
Ear twitching (controlled in some individuals)
Hand withdrawal (to heat and pain)
Digestive reflexes (autonomic)
Shuddering
Starting (to sudden noise, etc.)
Shivering
Trembling
Rhythmic contractions (in epilepsy, paralysis agitans, etc.)

[1] Warren, Howard C., *Elements of Human Psychology*, Houghton, Mifflin Co., 1922, p. 233. Reprinted by permission of, and by special arrangement with, Houghton Mifflin Co.

B. Largely pure—subject to inhibition or reinforcement

Winking
Accommodation, ciliary reflex
Eye-fixation and convergence
Hiccoughing
Sneezing
Patellar reflex (knee-jerk)
Dizziness reflexes
Yawning
Vomiting
Facial reflexes (bitter taste, etc.)
Salivation
Tickle reflexes
Hand twitching (to dermal pain)
Plantar reflex (to stimulus on sole of foot)
Great toe reflex
Vasomotor changes (blushing, paling)
Breathing changes (to specific stimuli and to onset of sleep)
Sudorific reflexes
Groaning
Laughing
Cramp movements
Squirming

C. Occasionally pure, more often centrally modified

Coughing
Swallowing and gulping
Visceral discharge, etc.
Generative reflexes
Reflexes to odors
Gasping
Weeping
Sobbing
Smiling
Wincing, etc.
Scowling
Stretching
Convulsive contractions (to deep pressure and heat, to pricking and other dermal pains, and to visceral pain)

D. Pure in infancy, centrally modified in adult

Sucking
Biting and grinding
Spitting
Hunger and thirst reflexes
Lip and tongue reflexes
Vocal reflexes
Turning the head
Tugging (wrist reflexes)
Clasping (elbow reflexes)
Reaching (shoulder reflexes)
Kicking (knee reflexes)
Stepping (gluteal reflexes)
Jumping (ankle reflexes)
Sitting up

Tossing	Bending forward
Grasping (finger reflexes)	Rising

E. Posture reflexes

Holding head erect	Standing
Sitting	Equilibration

CHAPTER V

INSTINCT

Questions this chapter seeks to answer: Does man possess instincts? Why is this an important problem? To what is the quarrel among psychologists due? Why is the evolutionary point of view important in the problem of instinct? What is the status today of the problem of heredity and environment?

REFLEXES are inborn forms of behavior. By inborn is meant nothing more than *present at birth*. It is very possible, as has been suggested, that reflexes are acquired in the prenatal period. Nevertheless, they are present at birth and hence we call them inborn. The problem that confronts us now is to ascertain, by means of the best evidence now available, whether human beings possess any higher units of native behavior than reflexes, namely, "instincts," or whether all other forms of behavior besides reflexes are acquired or learned acts, that is, habits. A veritable battle is now being waged among biologists, and particularly among psychologists, on whether man does or does not possess instincts. The problem is far from being merely of academic significance. Its practical application is far-reaching, since it deals with man's inborn powers, the sources and mainsprings of human behavior. Wars have been justified on the basis of a pugnacity instinct, and social and industrial conflicts are attributed to

The problem of instincts is of great social importance

such instincts as self-assertion and acquisitiveness. The almost universal rationalization, "such is human nature," which justifies anything and everything, and the notion of "the beast within us" which social reformers seek to eradicate or at least subdue, are based upon the supposition of the existence of instincts. An imposing structure of social psychology has been erected upon the foundation of instincts. We must examine this very important question before we can proceed with our analysis of behavior.

I

INSTINCT VERSUS INSTINCTS

What is meant by "an instinct," and what do the contending parties claim? The great American philosopher and psychologist, William James, defines an instinct as "the faculty of acting in such a way as to produce certain ends, without foresight of the ends, and without previous education in the performance." He enumerates the following forms of behavior as instincts: climbing, imitation, emulation, rivalry, pugnacity, anger, resentment, sympathy hunting, fear, appropriation, acquisitiveness, kleptomania, constructiveness, play, curiosity, sociability, shyness, cleanliness, modesty, shame, love, jealousy, parental love.

What an instinct is, according to James

Professor William McDougall, the staunchest of living champions of instincts, says that an instinct is "an inherited or innate psycho-physical disposition which determines the possessor to perceive, and pay attention to, objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner, or, at least, to experience

McDougall's definition

an impulse to such action." His list of instincts, which has been very widely accepted, includes the parental or protective instinct, the instinct of combat, the instinct of curiosity, the food-seeking instinct, the instinct of repulsion, the instinct of escape, the gregarious instinct, the instinct of self-assertion and submission, the mating instinct, the acquisitive instinct, the constructive instinct, the instinct of appeal, and several other minor instincts. He rejects play and imitation as instincts.

Watson's view

The leader of the anti-instinct camp is Dr. John B. Watson. From his studies on infants referred to in the preceding chapter he concludes:

> Man is an animal born with certain definite types of structure. Having that kind of structure, he is forced to respond to stimuli at birth in certain ways (for example: breathing, heart beat, sneezing, and the like . . .). This repertoire of responses is in general the same for all of us. Yet there exists a certain amount of variation in each—the variation is probably merely proportional to the variation there is in structure (including in structure, of course, the chemical constitution). It is the same repertoire now that it was when the *genus homo* first appeared many millions of years ago. Let us call this group of reaction man's unlearned behaviour.
>
> In this relatively simple list of human responses there is none corresponding to what is called an "instinct" by present-day psychologists and biologists. There are then for us no instincts—we no longer need the term in psychology. Everything we have been in the habit of calling an "instinct" today is a result largely of training—belongs to man's *learned behaviour*.[1]

Both points of view are correct

What is the difficulty in these altogether opposite points of view? The answer is that the points of view are not as contradictory as they appear to be on the surface. Both are correct.

[1] WATSON, JOHN B., *Behaviorism*, W. W. Norton, 1924, p. 79.

It is true that there are instincts, and it is also true that there are not instincts. The answer to the question as to whether or not there are instincts is another question, namely, what animal are you talking about? Professor McDougall is talking mainly about lower forms of life, particularly insects, since most of his illustrations of instincts are cases of insect behavior. Dr. Watson is speaking of human beings, and here he finds no instincts such as Professor McDougall discovers in insects and attributes to man.

Let us examine this matter.

"An instinct" is a definite, specific, native response of the entire organism to a definite, specific situation. That we find such behavior among certain living forms is certain. Here is a case in point:

Along the western shores of the long southern arm of San Francisco Bay there stretch broad salt marshes, through which tide-channels run, but which embrace considerable areas that lie above all but the very high tides, and which are mostly covered by a dense growth of a low, fleshy-leaved plant called samphire or pickle-weed (Salicornia). Here and there, however, in these areas there are small, entirely bare, level sandy places which shine white and sparkling in the sun because of a thin incrustation of salt over them.

Each September these bare places are taken possession of by many female wasps of a species of Ammophila, which is a long, slender-bodied "solitary" or "digger" wasp, that is somewhat gregarious in habit, but is not at all a "social" wasp like the hornets and yellow-jackets, the Vespas, more familiar to us. Now watching closely any one of these female Ammophilas flitting about these bare places, one can see the following performance take place.

First, the Ammophila, after various flights—flights of survey, we may call them—over the salt-encrusted ground, will settle

down somewhere on it, and, with her sharp jaws, cut out a small circular bit of the salty soil crust, which she gets out unbroken, and drags off a few inches to one side. Then she digs out, by means of her jaws, bit by bit, a little vertical well about three inches deep and slightly less in diameter than the circular bit of salt crust. Each pellet of soil dug out is carried away by the wasp, flying a foot or two from the mouth of the hole in any direction, and dropped. She does not plan to have any tell-tale pile of soil near the mouth of that precious hole in the ground. In emerging from the hole she always backs upward out of it, and while digging she keeps up a low humming sound. We might imagine this to be the joyous song of the home-making mother —but as we are scientific observers we had better restrain, if not our imagination, at least our unverifiable interpretation of things. Let us be properly matter of fact.

After the hole is about three inches deep our energetic Ammophila, climbing out with the last pellet and flinging it to one side, seeks for and finds the little circular bit of salt encrustation which was so carefully removed and put to one side at the beginning of this hole-making performance. This she now drags to the hole and with it carefully covers the hole's mouth. Then she flies away over the surrounding pickle-weed and disappears in it.

We must wait a few minutes now, sometimes only a few, sometimes as many as fifteen or twenty. If we like, we can look around us in the little bare space and we shall see other Ammophilas digging holes, going in head first and backing out, flipping pellets of soil away, humming their nest-building songs and altogether doing just what our first Ammophila did and in just the same way. But now, silence, and immovability! For the first Ammophila is coming back, flying low and heavily with what seems to be a dead looper or inchworm (larva of a Geometrid moth) about an inch and a quarter long, held in her jaws. She comes directly to the covered hole—how does she tell where it is, with its salt-crust cover making it look like all the rest of the

ground?—puts the limp inchworm down into the hole, going in head first and then coming up and out backwards. Then she recovers the hole with the salt-crust lid, and flies away again. After a while she is back with another limp inchworm which she puts into the hole, going through just the same performance as she did the first time. And so on until she has put in five inchworms. If we watch other Ammophila mothers we shall see that they vary little in number of inchworms put into their holes. The number runs from five to eight, or, rarely, ten, but is usually five or six.

Now what next? After taking the fifth inchworm down into the hole, Ammophila does not come out as soon as she has after putting each of the others down. After several minutes, however, she does come out, but instead of flying away she now begins to fill the hole with pellets of soil which she scrapes up here and there with her sharp strong jaws. Some of the pellets are the ones she scattered a foot or two away while she was digging a hole. If they are close by, she scrapes them in with her forefeet. If farther away she brings them in her jaws. She works rapidly, running and jumping about, making little buzzing leaps and flights, until she has quite filled the hole.

Then she does a clever thing. With her forefeet she paws and rakes the surface of the filled hole until it is quite smooth, and then with jaws and horny head she presses and stamps down the bits of soil on top until they are a little below the surface of the scale crust around the hole. Finally she gets against the circular salt-crust lid and neatly puts it into the depression on top of the filled-in hole so that it fits perfectly with the hard continuous salt crust around the hole's edge! Without saying anything about intention on the part of the Ammophila, it is certain that by this performance she has almost perfectly concealed the whereabouts of the hole. In fact, if we take our eyes off it, we shall have difficulty in finding it again: and yet we know, to start with, just where it is. How about various predacious birds or insects who would like to find it with its store of luscious inchworms?

And now Ammophila is finished with this hole, at last. But

we are not. Let us dig it up and have a look at those apparently dead inchworms, and also see if we can find out what kept Ammophila so long in the hole after taking the fifth worm down. So we dig up and examine the five inchworms. Sticking to the body of the last one put in, there is a little shining, white, seed-like thing. It is an egg which Ammophila had laid and glued on to the worm's body. And the worms themselves, instead of being dead, are alive but paralyzed. If we prick any one of them near head or tail it will wriggle just a little. If we prick one in the middle of the body it does not wriggle. Ammophila has stung each inchworm in one or more of the middle tiny ganglia or body-brains which are ranged segmentally along the under side of the body; a very exact and useful surgical operation. For the worms, which are, of course, to serve as food for the Ammophila grub that will hatch from the single egg, if dead would soon decay and be useless to the grub, and if not paralyzed would promptly dig their way up and out of the hole before the egg even hatched. So down in the darkness of the filled-in hole there will soon begin the tragic eating alive of the worms by the Ammophila grub which soon hatches from the egg and which will find in the inchworms enough food to last it until time to pupate, when it takes no more food. Then, later, it will issue as a full-fledged new Ammophila, to dig its way out and find another meat, and, if a female, go through this same performance next September. And it will do all this without ever being taught by its mother or any other Ammophila. In fact it will never see its mother or father, nor will they ever see it.[1]

If the nest-building of the wasp is an instinct, then Dr. Watson is certainly right in his contention that there are no instincts in human beings, since there is nothing that a child can do at birth that even approximates this very complex and most purposive activity of the Ammophila. When the chick first crawls out of its shell it can skirmish for itself; it is pos-

[1] KELLOGG, VERNON, *Mind and Heredity,* Princeton University Press, 1923, pp. 1-6.

sessed of definite reaction patterns. The same is true of the new-born fish. But the human infant at birth is a helpless mass of squirmings and twitches. If it remained in that state it could not possibly survive unless taken care of during its entire span of life. No specific modes of behavior such as are found in a list of instincts are discernible in the new-born infant. If they appear later we are not justified in calling them "instincts."

Human beings do not have instincts

We may now attack this problem more systematically.

II

The Evolution of Native Behavior

At the very outset we must draw a distinction between *instinct* and *instincts* in order to avoid confusion of thought. *Instinct* is a scientific term for *native behavior*, while *instincts* are definite and specific *forms* of native behavior. Now it would be absurd to deny the presence of *instinct*, that is, of native behavior, in man. We have already encountered such native behavior in the reflexes. But the problem of instincts is concerned with the state in which this native behavior exists: whether such differentiated acts as pugnacity, jealousy, envy, and other *instincts* are native behavior or acquired habits. This is the meaning of the question, "are there any instincts?"

Instinct is not instincts

With this forewarning we may proceed with the discussion of the problem.

If there are instincts in man they should be recognizable at birth, as are the instincts of insects. Insects can, at their very birth, perform quite definite acts in response to certain stimuli. But there is no such behavior observable in human beings.

Instincts are present at birth

All that an infant is capable of at birth is to engage in a mass of random, unorganized movements or squirmings, which have no resemblance whatever to any particular instincts. If instincts appear after birth, as is claimed by many, what reason is there for calling them instincts rather than habits, since the education of the human organism begins on the very day of its birth and, for all we know, even before its birth? The cardinal error of the "instinct psychologists" is the omission of the factor of evolution in thinking about native behavior.

Native behavior is an evolution

Organisms belonging to different stages in the evolution of life possess native behavior, the fundamental nature of which varies in complexity and flexibility. The simple structural organization of the amœba determines the extent of the world in which it lives as well as the scope of its needs and, consequently, the scope of its activities. Its behavior is no more diverse than its machinery demands. In contrast to this simple existence of the amœba is the immensely complex life of man, created by a highly differentiated and specialized structure of sense organs, muscles, limbs, and nerve tissues. The more highly organized life becomes, the wider is the scope of its activities, since the world in which it lives becomes more extant and varied. The evolution of life presents a spectacle of a universe gradually unfolding from vague, homogeneous chaos to systematized heterogeneous order, with a corresponding increase in complexity and specialization of behavior suited to meet the widening expanse of the realm of life. The vague, undifferentiated world of the amœba is met by similarily vague, undifferentiated movements. The very definite, differentiated world of man is reacted to with a large number of definite, specialized actions. The world of

the amœba is not the world of the insect; that of the insect is not that of the vertebrate; and that of the vertebrate is not that of the mammal. And the behavior of these organisms is in keeping with the world in which they live.

There is increase in flexibility

Running parallel with the increase in the complexity of the environment and of behavior, we find an increase in the flexibility of the behavior. Flexibility means the degree to which the behavior is subject to the molding influences of the environment. Molding means possibilities for variation, and therefore, where the possibilities for variation are largest, there we have also the greatest scope for meeting the widest variety of situations.

Native behavior differs for different forms of life

This brings us to the heart of the instinct problem. Instinct as native behavior cannot possibly mean the same thing for different forms of life. The instinct of the insect is not the instinct of the vertebrate, and that of the vertebrate is not the instinct of the mammal. The difference lies in the degree to which the native behavior is subject to habit formation, or, in other words, the degree of variability of the organism at birth. All native behavior is modifiable from two angles: first, in the situation that elicits a certain behavior, and, second, in the kind of behavior that a certain situation evokes. Thus, as a result of training, a large number of varied stimuli can be made to evoke one and the same specific response, or a number of varied responses may be aroused by the same stimulus. Both these factors imply the number of habits that the animal can form, and the degree to which any one habit deviates from the native behavior from which it springs. And it is the original state of the native behavior that determines both the number of habits that can be formed and the degree of habit formation. When the native material is least variable,

the possibilities for the double aspect of habit formation are most limited, that is, the animal can form but few habits, and even these few habits vary but little from its native reactions. And when the native behavior is most variable, as in man, the scope for habit formation is widest, while the habit resembles nothing that is present in the original behavior. Now variability is in inverse proportion to definiteness of original behavior. Where specific forms of behavior exist at birth, the possibilities for modification or habit formation are most limited. In such cases we can speak of the presence of specific instincts. But in the higher, and particularly the highest, forms of life, where definite forms of native behavior are present in a slight degree, or not at all, we cannot speak of instincts, but only of general tendencies to behavior. Native behavior is an evolution from more or less specific native acts to a general mass of random movements which gradually become split up into a large number of specialized single habits.

Where native behavior consists primarily or altogether of random movements, there are no instincts, since instincts are inborn specific actions, while in man every specific act is an acquired property, formed out of the general chaotic mass of native tendencies. The native behavior of man becomes useful only when it becomes differentiated into habits. A habit is not even a modified or inhibited instinct, since a specific human act resembles in no way anything that is natively present. We can speak of a modified instinct only where, in the finished act, there is easily discernible the presence of the unmodified, native root to which the habit can be definitely referred. There is nothing in the infant that in any way approximates to such developed forms of

behavior as curiosity, pugnacity, imitation, etc., which are usually classed as instincts. In fact, the standard criterion for instinct—namely, an act common to a species and somewhat perfect on first appearance—is inapplicable to human behavior. Birds will fly when anatomically mature, and all birds of a certain species will fly alike. But a child develops an individual manner of locomotion, and it is extremely doubtful, and even improbable, that it would ever walk, were it not for the presence in the environment of factors that induce it to learn to walk. The vocalization of an insect is altogether native, that is, an instinct. But the song of the bird is influenced by the conditions in which it is reared. A sparrow reared with canaries will not sing like a canary, but neither will it chirp like a sparrow. The song of the sparrow is thus part native and part acquired, with the native element readily discernible in the finished product. But the speech of man is acquired in form and substance, and no native element is present in it excepting that it is based upon the native tendency to produce sounds. But the native element is far removed from that which characterizes the insect or even the bird, since the human infant can acquire not only one form of vocalization, but many, and can keep on acquiring them more or less perfectly throughout his lifetime.

We note, then, that instinct is not an invariable something, and therefore cannot be applied indiscriminately to all living forms. If by instinct is meant anything resembling the native behavior of the insect or even that of the bird, then man certainly has no instincts. He is a bundle of habits, and even these are continually subject to modification. There is nothing predetermined or inflexible in his psychological make-up. If

Instinct of insect is not that of man

by instinct is meant simply native behavior, then the insect has instincts as such, the bird obeys instinctive tendencies, and man possesses a general urge to behavior. The insect comes into the world quite a finished product, the bird less so, the man least so.

This interpretation of instinct is supported by biological and psychological facts regarding the nervous system, that is, its evolution and its functioning. The evolution of the nervous system from a simple to a highly complex structure is a progressive growth in plasticity of nervous organization, and hence of increased possibilities for modification and control of behavior. Concomitant with this growth in complexity and plasticity runs a higher and higher functioning, from the mechanical reflex to the intelligently controlled and directed voluntary act. The domain of mechanical behavior thus diminishes gradually, until it shrinks into insignificance with the rise of higher nerve centers. In the simplest nervous system, impulses are switched over immediately from receptors to effectors, resulting in trigger-like behavior. In the highly evolved nervous system the impulse is retained in a central station where its final destination is decided upon. The nervous system, beginning as a mere transmission mechanism, becomes a regulating, controlling and deliberating organ. Instincts, as such, are present or absent in direct proportion to the complexity and the concomitant variability of the behavior. In the simple nervous system, behavior approaches closest to the mechanical reflex, and there we have instincts. In the complex nervous system, behavior partakes more and more of the nature of directed, voluntary action, and consequently is farthest removed from instincts.

The evolution of the nervous system indicates no instincts in man

III

THE PROBLEM OF HEREDITY

It is interesting and significant to note that the new conception of the nature of man's native behavior finds support in the radically changing point of view concerning the relative rôle that heredity and environment play in the determination of the life of the newly born organism.

There is a new outlook on heredity

The foundation of the doctrine of heredity is the so-called unit character theory, which has been interpreted by one "popularizer" of scientific knowledge to mean "that heredity and not environment is the chief maker of men; that it is essentially the man who in the long run makes his environment, much more than it is the environment which makes the man; that man is not a pawn on the chessboard of environment, the football of circumstance and the puppet of chance and change; that he is not a will-o'-the-wisp of fortune, a marionette whose wires are pulled by the hidden hand of doom; that he is not, as the glib reformer has taught you to believe, the helpless victim of the passing education, philosophy and theories of pedagogy of his time; but that, in the germ cell, from which every man is born, there are resident those powerful personal forces by which he can rise in well-nigh any environment and, within the limits of human freedom, exclaim: 'I am the master of my fate; I am the captain of my soul.'" [1]

The unit character theory as seen by "popular" science

Much current social propaganda masquerades in the cloak of the "science" of genetics. We are told that unless we heed

[1] WIGGAM, A. W., *The New Decalogue of Science*, Bobbs-Merrill, 1923, p. 42.

the warning of heredity the whole structure of civilization, already standing on unsteady feet, will soon totter into an abyss. By heredity, the argument proceeds, the non-white peoples are inferior to the white peoples, and consequently it is the civilization of the whites that must endure if there is to be a civilization at all. But white civilization is threatened from two quarters. In the first place, there is the menace of the birth rate. The non-whites are increasing more rapidly than the whites, which means that inferior races will in the long run inherit the earth and the fullness thereof. The earth will truly be dark, physically and intellectually. Again, there is the menace of the "rising tide of color." The non-white peoples are weary of the domination of their superiors and of being the white man's burden, and are actually uniting in a concerted effort to overthrow the white man and his civilization. This is danger number one.

It is applied to civilization

The next danger comes from within the white peoples themselves. The white race is divisible into three stocks: Nordics, Mediterraneans, and Alpines; and it is destined by heredity that the Nordics shall be the intellectual cream of the whites, and the creators, sponsors, protectors, and carriers of the germ plasm of civilization and progress. But the Nordics, like the white family as a whole, besides being in the minority as to number when compared with the Mediterraneans and Alpines, are also committing race suicide, so that even if by some miracle the whites remain in control of civilization, it will be the inferior whites who will decide its destiny. Furthermore, there is an actual "revolt against civilization" from the inferior white stocks. They also are tired of being tail-enders to their superiors, and are planning to dethrone the Nordics forcefully.

And to races

Civilization thus stands in double danger, first, from the inferior non-whites, and, second, from the inferior whites themselves. The remedy is to obey the call of heredity. Let the white peoples multiply at a great rate, or at least see to it that the birth rate of the non-whites be decreased in some manner; and furthermore, let only the superior whites increase their number, or at least manage in some way that the inferior whites reduce their progeny. If the above remedy is unavailable, then a desperate means must be adopted to save civilization, namely, to force the inferior whites and non-whites to recognize the superiority of the Nordic stock and submit to its leadership.

Heredity is hailed as the savior of civilization

As in the case of instinct, so also in that of heredity, the influence of evolution has been overlooked. The test of a scientific law is predictability. The chemist can predict specifically what the result will be if certain elements are combined in certain proportions. If heredity were a law applicable to man, the same condition should obtain. But no one can predict what type of offspring will result from the mating of a man and a woman, each possessing certain traits. Neither physical, nor mental, nor character traits are in the least degree subject to prediction. Dr. Herbert S. Jennings, one of the most outstanding authorities on genetics, writes as follows regarding the unit character theory:

But the importance of heredity has been exaggerated

> But this theory of representative particles is gone, clean gone. Advance in the knowledge of genetics has demonstrated its falsity. Its prevalence was an illustration of the adage that a little knowledge is a dangerous thing. The doctrine is dead—though as yet, like the decapitated turtle, it is not sensible of it. It is not true that particular characteristics are in any sense represented or condensed or contained in particular unit genes. Neither eye-color,

The unit character theory is not true

nor tallness, nor feeble-mindedness, nor any other characteristic, is a unit character in any such sense. There is, indeed, no such thing as a "unit character" and it would be a step in advance if that expression should disappear.

. . . . .

Characteristics are not inherited

Every creature has many inheritances, which one shall be realized depending on the conditions under which it develops; but man is the creature that has the greatest number of possible heritages. Or, more accurately, men and other organisms do not inherit their characteristics at all. What their parents leave them are certain packets of chemicals which under one set of conditions produce one set of characters, and other conditions produce other sets. In man, the number of diverse sets that may thus be produced is very great; although it is, of course, not unlimited. But what the limitations are, cannot be stated from general biological principles or from what we know of any other organisms; they can be discovered only by concrete studies of man himself.

. . . . .

There is no biological foreordination

Not only what the cell within the body shall become, but what the organism as a whole shall become, is determined not alone by the hereditary materials it contains, but also by the conditions under which those materials operate; or by other materials that may be added later. Under diverse conditions the same set of genes will produce very diverse results. It is not true that a given set of genes must produce just one set of characters and no other. It is not true that because an individual inherits the basis for a set of characteristics, he must have those characteristics. In other words, it is not necessary to have a certain characteristic merely because one "inherits" it. It is not true that what an organism shall become is determined, foreordained, when he gets his supply of chemicals or genes in the germ cells, as the popular writers on eugenics would have us believe. The same set of genes may produce many different results, depending on the conditions under which it operates. True it is that there are limits to this; that from

one set of genes under a given environment may come a result that no environment can produce from another set. But this is a matter of limitation, not of fixed and final determination; it leaves open many alternative paths. And even the limitations lose their sharp definition when we contemplate the possibility of introducing other chemicals among those produced by the original genes. Every individual has many sets of "innate" or "hereditary" characters; the conditions under which he develops determine which set he shall bring forth. The characteristics that appear under training are as much inherited characters as are those appearing under other conditions; for the conditions help determine the characters in the one case as in the other. These sweeping statements are substantiated by precisely-known facts in many organisms.

As to racial characteristics, the same authority states:

There are no fixed racial characteristics

It is particularly in connection with racial questions in man that there has been a great throwing about of false biology. Heredity is stressed as all-powerful; environment as almost powerless: a vicious fallacy, not supported by the results of investigation. We are warned not to admit to America certain peoples now differing from ourselves, on the basis of the resounding assertion that biology informs us that the environment can bring out nothing whatever but the hereditary characters. Such an assertion is perfectly empty and idle; if true, it is merely by definition: anything that the environment brings out *is* hereditary, if the word hereditary has any meaning. But from this we learn nothing whatever as to what a new environment will bring out. It may bring out characteristics that have never before appeared in that race. What the race will show under the new environment cannot be deduced from general biological principles. Only study of the race itself and its manner of reaction to diverse environments can give us light on this matter.[1]

[1] Taken by permission from Jennings, *Prometheus,* published and copyrighted by E. P. Dutton & Co., Inc., New York, pp. 17-18, 39-41, 54-55, 57-59.

Evolution has been overlooked in heredity as in instinct

Thus the threatening shadow of heredity is dissipated by the light of greater knowledge. The hereditists have overlooked the same point as did the instinct psychologists—the significance of evolution. Life begins as a simple cell and grows gradually more and more complex, until in man we have the most highly differentiated or specialized creature in existence. Increased complexity is accompanied by increased plasticity or educability. The more moldable the organism is at birth, the greater the influence of environment upon it. This is the meaning of the gradual increase in the period of infancy, from those animals that have no infancy, to man in whom it lasts for several years. Infancy means plasticity, and plasticity means educability. The rôle of heredity in the unfolding spectacle of life becomes therefore increasingly less significant, and that of environment increasingly more significant, as organisms become more plastic. Man is thus neither "born" nor "made," but born to be made. Whatever problems and difficulties human beings may have, they are of their own making, and not to be blamed on heredities and instincts. And what they make they can also unmake, provided they are honest with themselves and earnestly desire to see themselves as they really are.

CHAPTER VI

HABITS

Questions this chapter seeks to answer: What is the difference between reflexes and habits? How do habits grow out of reflexes? Why do people differ in habits? What is the social significance of habits? How do we acquire our stock of habits? Why are indirect influences more important than direct instruction? How does the conflict between individual and society arise? What is the significance of the conflict? How and why do habits give rise to bad results? What is an abnormal habit?

I

The Nature of Habit

The one significant difference between the behavior of an adult and that of an infant in its first few months of existence, is the specific nature of the reactions of the adult to any situation, in contrast with the random and meaningless movements of the infant. Haphazard reactions are futile, since they accomplish no definite end. It is only when the general and chaotic reactions become specific and orderly that they become useful. Random movements are valuable only in the degree to which they become coördinated into specific, fixed reactions to specific situations. When the chick first begins to peck it strikes all around the object and, hitting it every once

Native behavior is random

in a while by sheer accident, thus wastes a great deal of effort and time in ineffective movements. After a period of practice, however, the chick becomes sure and effective in its pecking. A single reaction to the specific situation has replaced the numerous random movements. The effective has been substituted for the ineffective. When a very young infant sees a bright object it makes a general lurch of body, arms, and legs toward the object, its arms in particular waving in all directions fanning the air, without touching the object, or touching it only by accident. An immense amount of energy is thus expended uselessly. Likewise, if the infant is spoken to, its head will move in all directions in a general exploratory movement. With the passing of time these chance movements are displaced by one single movement which always achieves the desired end. When a person is learning to swim his arms and legs fly in all directions, he becomes exhausted and accomplishes nothing. But as soon as arms and legs become coördinated into one unified, although complex, movement, the swimmer moves along with little effort.

The first behavior of the infant is chaotic, aimless and ineffectual. If the human infant remained in its original state throughout its life it would remain helpless, which means it could make no useful adjustments, but only general searching movements. It would waste energy, with nothing accomplished. But as the mass of random unspecialized movements becomes split up into a number of definite, specialized acts, the behavior of the infant increases in effectiveness. What happens is that a number of unconnected reflexes become tied up into a single complex unit of behavior, so that out of the chaotic mass of motions present at birth there emerges, by degrees, a number of orderly systematized actions. These

Random movements become coördinated into habits

actions we call habits, or learned behavior. A habit is thus an acquired integration of reflexes; and all specific forms of human behavior are habits, since the human organism possesses nothing at birth but reflexes. The chemist exposes certain chemical elements to certain conditions and obtains a compound whose properties are altogether different from those possessed by each separate element in its constitution. Likewise, when reflexes are exposed to the influence of certain environmental conditions, they combine into a single compound action whose nature is entirely different from the single reflexes of which it is composed.

II

INDIVIDUAL DIFFERENCES IN HABIT

The question has no doubt occurred to the reader, what of individual differences? If all human behavior can be explained in terms of habit, and habit is the result of environment, why do individuals who were reared in the same environment vary in habits? The answer is, in the first place, that there is no such thing as "same" environment for two individuals. Two children reared in the same home do not have the same environment, since the parents themselves have become modified with each succeeding child. Even in the case of twins the attitude of one or both parents toward the two children is never the same, and it takes very little environmental modification to produce a significant effect upon the sensitive human plant. In the second place, if to the above we add the fact that the reactions of two children to the same situation cannot be the same due to differences in their structural make-up, we have the two sources that will

There is no such thing as same environment

account for all individual variations in behavior. To take a simple illustration: A child with a very fine musical ear is reared in a home where it hears music performed on a piano that is out of tune and of poor tonal quality, and this continues for several years. Now supposing a piano of fine make replaces the poor one, and the child hears the same music performed on the better instrument. Which is the child more liable to prefer, the music of the old or of the new piano? No matter how fine an ear the child has, its preference will be for the instrument it is accustomed to hearing. Let us suppose that in the same home there is another child with a dull ear. The first child will respond much more intensely to the fine instrument than will the child with the poor auditory sensitivity. If a selection which the children have been accustomed to hearing on the fine piano is played to them on an instrument that is somewhat out of tune, the first child will be pained while the second one will remain unaffected. The response of both children is determined by their environment, but the same environment produces different effects and creates different habits, because of structural differences. A sensitive, temperamental, highly intelligent child brought up in criminal surroundings will turn out to be a greater criminal than a phlegmatic one reared in the same environment, because the reactions of the intelligent child are more intense and vivid, and because it is more sensitive to its environment than is the other. The rearing of a child with an alert and more sensitively organized constitution is a much more delicate problem than is that of its duller brother. It is easier to ruin a flower than a weed, since influences which produce an intense effect on the one will leave the other untouched.

III

FIXED AND PLASTIC HABITS

The influence of the environment in turning random native behavior into definite acquired actions results in the making of two types of persons, one of which is a social liability, the other a social asset. The first type consists of a group of individuals that possesses a number of sets of fixed reactions to certain situations so that whenever or wherever one of these situations presents itself the response to it is invariable. To such people an act is right or wrong irrespective of when, where, or by whom it is enacted. There is but one right religion, one right way of eating, one right food; and these right ways are always their ways. Nothing is relative, everything is absolute in time and space and motion. These people never do as the Romans do, since the Romans are wrong by virtue of the fact that Roman ways are not their ways. If the Romans are to be saved their ways must be changed, and that not by mere sprinkling, but by complete immersion. Such persons are found in every avenue of human interest, activity and institution. They build a solid wall of obstruction against any change in their own social order, and they condemn every other existing order that differs from their own. Right and wrong are established and permanently fixed by their race, their country, their state, their town, their social group, their home and themselves, individually. Wherever they pass they leave a trail of bitterness, resentment, conflict and confusion. Within such groups one is free to think as they think, act as they act, worship as they worship, condemn and approve as

Habits make two kinds of persons socially

Obstructionists

they do, or one is free to get out—but only with a bad reputation.

The second group of people possesses habits which are adaptable to varied conditions, and can meet a situation on its own merits. Such persons are open-minded and tolerant. They fit readily into any social or intellectual condition. They are ever growing and expanding, their interests keeping in step with time; they do not mock and condemn, and they do not lose their identity because they are not swamped by the crowd. They realize that social customs and traditions are social utilities which are therefore subject to modification with changing needs. They judge a tool by its power to produce a desirable end, and since ends differ tools must differ. Their guiding thought is that the same goal may be reached by diverse roads. For them there are no best races, no best religions, no best caste or social position; there are only human beings, each seeking his destiny according to his best light. This does not mean that to such persons one act is as good as another, but rather that, instead of intrenching themselves behind a solid wall of self-righteousness and shutting out the light from the other side, they are willing to give and take, eager to enrich their own lives by close contact with the lives of others.

Liberals

IV

Direct and Indirect Influences in Habit Formation

Habits make or break a man. A man is known professionally by what he can do; socially, by what he is. And what a man can do is quite different from what he is. He may be praiseworthy in his work and detestable in his character.

Every person thus possesses two sets of habits: an intimate intrinsic set that *is* the person, his character, his real functioning self which he knows only from the effect it produces on others; and an extrinsic, somewhat impersonal set, that consists of skills, such as driving a car, swimming, playing golf, and other accomplishments. In most cases there is a clear-cut demarcation between the two sets of habits. The Bureau of Vocational Guidance of Harvard University made a statistical study of the causes for discharges from industrial establishments in 4,375 cases. Of these, 34.2 per cent were dismissed for lack of skill or technical knowledge, and 62.4 per cent for general personal habits. Apparently the man and his work, or intrinsic and extrinsic habits, are not always identical.

Some habits are deliberately acquired

Now a skill is directly and deliberately acquired. One knows under what circumstances one has learned to operate a machine or to play tennis. But what is the source of those traits and characteristics that make the real man? Psychologists have sought the secret of character in numerous experimental researches, with but little success. One fact, however, is clear, namely, that one seldom acquires character directly or deliberately. Two individuals, one likable and attractive, the other just the opposite, could give but the haziest account of the reasons for the effect they produce upon others. Nor could the outsider do any better. Let anyone make an attempt to give a description of some person he is very fond of, and only the vaguest generalities will be stated. Apparently one *is* just that way and has just *become* that way. But there is a discernible cause, and it lies in the indirect influence of the early environment.

Some are acquired indirectly

A human infant is a delicate, sensitive plant which is nour-

ished by the environment in which it has its being, and its traits are absorbed from the soil in which it develops. Indirect influences in character formation are most effective simply because they are indirect. The apparently insignificant often turns out to be of greatest significance. A tiny microbe doing its work in the system will eventually work more havoc than will a knife-cut. The early environment of the infant is full of germs and microbes, in the form of the habits of the surrounding adults who, though themselves unaware of their influence, may shape the destiny of the young plant in a most invidious manner. A man whom you meet after several years' absence will appear to you as having undergone marked changes, but when you call his attention to these changes he will deny them, and honestly so, since the transformation has been so gradual as to elude his notice. The adage, "Show me your friends and I'll tell you who you are," is psychologically sound, for in the long run the friends will make you like unto themselves. If there is enough poison in a liquid to enable a person to taste it, he will discharge it. But if the amount of poison is so small that he cannot taste it, he will finally imbibe enough to destroy him. The small is more fatal than the big.

Indirect influences are most important in habit formation

Thus the psychology of character formation is the psychology of indirect influence versus direct training. Direct training is helpless before the power of indirect influence. Besides, direct training comes after indirect influences have already done their work and established functioning habits. Furthermore, direct training is most usually negative, in the form of preachments, admonitions, scoldings, and "don'ts." The writings of psychoanalysists and the work of Dr. Watson on infants afford ample evidences of the power of the environ-

ment in molding the pliable substance of human material. If you want the key to the future of the child, examine its parents. Children lie because adults indulge in the luxury of fibbing. Children gossip because they find themselves in a gossipy atmosphere which they drink in. Children develop undesirable habits because they live with such habits and are helpless before them. Adults deny this in self-defense, and resort to heredity, instincts, "such is human nature" and original sin, in order to account for delinquencies in their offspring. But these are all evasions of responsibility, which only increase the evil instead of eliminating or even alleviating it. The refusal or inability of the adult to recognize his own bad habits makes him responsible for all the bad habits of the young. If the new generation goes to the dogs, it is because the old one is already there.

They mean the making of character

V

INDIVIDUAL AND SOCIAL HABITS

A human being is a combination of two types of habits. One type consists of those unique forms of behavior or personal ways of doing things which differentiate one person from another, and which constitute what we call "individuality." In addition to individual characteristics of behavior, each person possesses habits in common with other persons. It is this similarity of habits which brings about the grouping of human beings into members of a certain race, tribe or nation.

Some habits are individual, others are social

Social and individual habits are closely interrelated, in that individual habits grow out of social habits. A language is a common social habit, but each member of a group using the same language uses it in a somewhat different manner from

that of every other member of the group. Each individual thus produces a modification upon the social habits of the group, and it is the sum total of these modifications of social habit by personal need that is responsible for the existence of individual variation in social uniformity of custom and tradition. The social habit forces itself upon the individual from the outside, while the individual habit is internally motivated. The modification of the old by the new is a biological necessity, a law of nature, which operates most intensively among human beings, where differences in inherent organic structure are most marked.

The two interact

The significance of the modification of social habit by individual need resulting from the interaction of the two, is of the most importance. In it we find the natural background for all ethical and moral issues as, for instance, the problem of the individual versus society, the child versus the parent, the new generation versus the old, and freedom versus authority. Society must insist upon a common form of behavior on the part of all its members in order to maintain its stability. But it also must give free play for individuality, or the law of variation would lead to the upsetting of the social order by force, as history amply attests. And if a social order which suppresses individuality is not destroyed by revolt, it is bound to stagnate as a result of its own inertia. The modification of social habit by individual habit is therefore of benefit to the group, since it keeps social habits vital and growing. Wherever there is life there must be change. It is the law of the modification of the old by the new which is responsible for all social progress. Apparently the individual does not exist for society nor society for the individual, but both for each other, since society makes possible individuality,

The interaction is significant

and individuality prevents social extinction through stagnation.

Freedom and authority are mutually interdependent. There is no freedom where there is no authority, as there is no new where there is no old. Authority is the foundation of freedom and freedom is the capstone of authority. The one is conditioned by the other, as variety is conditioned by unity. Society is a living growing unit only when it has variety in its midst, while individual variety must result in social unity or there is chaos. How society can best function without stifling the individual—and it functions best only when it stifles him least—how the individual can best express his individuality without disrupting society—and he can do so only when he does not disrupt society—constitutes a nice psychological problem for the social philosopher to solve.

There is no freedom where there is no authority

VI

BAD HABITS

A habit is a utility, a tool. Habits enable the individual to meet situations with efficiency and dispatch. Hence habits are intrinsically good. But any asset may become a liability when not kept within its proper bounds. This is often true of habits. A bad habit is a good habit gone to seed. Of bad habits, four are most prominent in that they are most common. These are fixed habits, vicious habits, evil habits, and annoying habits.

Habits may yield bad results

When any habit is permitted to have its own way it will gradually establish itself as a tyrant with absolute power over its subject. What was intended to be the servant becomes the master. The tail gets to wag the dog. Men permit themselves to become slaves to smoking, work, routine, machines,

and artificial conveniences, and thereby lose their one great prerogative over all other forms of life—the power of adaptability. Such persons simply become automatic machines or a Punch and Judy apparatus responding to buttons, pulleys, strings, and wires. Should a situation change in the slightest degree they become irritated and spread confusion all about them. Any person who has a set of fixed, unalterable habits to suit every occasion has ceased growing. He is no longer human. And while he may give the impression of being efficient in his particular work, he is really inefficient, since he is not only standing still himself but may also be preventing others from making progress.

Fixed habits

Vicious habits consist of practices that are bodily harmful if engaged in to excess. Such habits invariably yield much gratification to their victim, but the more satisfaction they give, the more destructive they become. Excessive smoking, drinking, and eating belong in this category. There are persons who permit themselves the luxury of entertaining general bad health, others enjoy being the victims of circumstances, some take pleasure in being persecuted, or harboring grudges or suspicions, while not a few become medicine fiends, and still others chase food fashions and hobbies, or the latest breathing and exercise fads. Then there are a few choice spirits who have formed one of the most disrupting of all vicious habits, namely, to have no regular habits at all, with the result that they become drifters, wasters, and social burdens. These are the *blasé*, bored, sophisticated intelligentsia who undermine their health in order to sport temperaments for public admiration.

Vicious habits

Evil habits, although they may directly and immediately benefit the individual, are detrimental to society. Such habits

are the main assets of a goodly portion of the population of every community, which lives off the fat of the land by preying upon the vast mass of unwary citizenry. The petty thief who falls into the hands of the law is a sheep in comparison to these wolves who roam the land not only free and happy, but often honored by their very victims. They create social and religious prejudices and exploit political and economic situations to satisfy an insatiable desire for social power and financial gain. Another type of person who belongs in this company is the "well-meaning" reformer, zealous, but ignorant and prejudiced, who spreads ill will, suspicions and confusion wherever he passes. He is the social busybody who has a patent cure for all ailments, most of which are of his own making. He is ever seeking to reform something or somebody, everybody's business being always his business.

Evil habits

Annoying habits are personal eccentricities that give the individual much satisfaction but are a source of irritation to others, particularly to those who are forced to live continuously in their presence. These habits often undermine friendships, and are the principal cause of the "incompatibilities" of married life which send one or the other of the parties to seek relief in divorce courts. Who knows how many perfectly innocent persons have become distracted by such apparently small matters as constant gum-chewing in their presence, the repeated use of a pet word or phrase, or a way of imbibing soup. Fannie Hurst once wrote a story in which a potentially happy home is broken up by the manner in which the husband handled his soup spoon. Her story is not fiction, it is real. Tragedy often lurks in unexpected quarters, and its steps are more sinister because they are muffled. A tree is more often destroyed by the constant boring of an insignificant

Annoying habits

worm than by the blows of an axe. An eccentricity which appears to be fascinating or "cute" at first might become unbearable when a person has to live with it day in and day out, year after year.

VII

ABNORMAL HABITS

An abnormal habit is either a persistent, non-adjustive reaction, that is, a reaction that interferes with rather than aids in making an adjustment to one or several situations, or an undesirable deviation from average behavior in direction and degree such as to be easily perceptible, and to mark the person as being queer. To the former belong disabilities such as functional paralysis and stuttering, while the latter includes compulsions, slips of the tongue, and memory lapses.

In functional paralysis voluntary control of a limb is lost. The muscle or muscles involved are structurally intact, but for some reasons to be found in the history of the person the function is disturbed.

Functional paralysis

In one form of this disturbance the muscular fibers have lost the powers to shorten when stimulated in the ordinary manner. The muscles are soft and relaxed and the limb they move is flaccid. In another form the muscles are hard and contracted. In both forms voluntary control of the limb is lost. Paralysis is one of the symptoms of hysteria. Functional paralysis appears and disappears without any apparent reasons.

A compulsion is an act performed by a person for no apparent reason and without any apparent motive. The person appears to be driven to act in a certain way by some force

beyond his control. We find such compulsions ordinarily even in otherwise perfectly normal people. Instances are the impulse to avoid cracks on a sidewalk, or to touch every post. One man was annoyed for weeks by a compulsion to overturn two stones on a wall near his house until finally he sneaked out at night to commit the act. More serious compulsions are to steal, to set fire, even to kill. Compulsion

Compulsions assume various forms of behavior, such as *tics*, or sudden little movements or shakes of short duration of one part of the body, ritualistic acts, bizarre movements, ceremonials that the person performs, such as stopping and bowing before going through a door or turning around in a complete circle before sitting down. Wanderlust, an irresistible urge to roam about, and kleptomania, an uncontrollable impulse to steal just for the sake of stealing when the article taken has no value or is not wanted for any use, are instances of compulsions. Some other compulsions are pyromania, an impulse to set things on fire, dipsomania, an impulse to drink intoxicating liquors, homicidal mania, an impulse to kill.

A man of about forty, living in a little town, had saved some money; his wife persuaded him to come and spend it in Paris. He settled with her in an hotel in the metropolis. One day, after a short absence, he came back to the hotel and found that his wife had disappeared, taking the little hoard with her. The poor man was so upset that he was deprived of utterance, and remained speechless for eighteen months. Now, though seemingly cured, he is still liable to the same accident; at the least emotion or fatigue he loses again the use of speech for a fortnight or for two months.[1] Mutism

[1] Originally reported by Charcot. Cited by JANET, *Major Symptoms of Hysteria*, p. 211, copyright, 1913, by The Macmillan Company; reprinted by permission.

Some speech disorders are due to structural defects in the speech organs, like a cleft palate, malformed arch, etc. It is probable that not more than ten or fifteen per cent of speech difficulties are caused by such structural defects. Stuttering is mostly a functional disturbance. It is a symptom of some anxiety, fear, and lack of emotional stability.

Stuttering

In a clinical study of one hundred cases of speech disorders, it was found that 58 per cent were hysterics and 19 per cent suffered from anxiety neurosis. Another study of forty soldiers and of two hundred school children from one to eighteen years of age, showed that 52 per cent of the children and 54 per cent of the soldiers suffered from a marked feeling of inferiority, while 35 per cent of the soldiers were moody, sulky, and depressed.

Dr. John B. Watson gives the following interesting account of slips-of-the-tongue errors and lapses:

> In waking moments we wish only for the conventional things which will not run counter to our social traditions or code of living. But these open and above-board wishes are not very interesting to the psychologist. Since they are harmless and call for the kinds of things that everybody in our circle wishes for, we do not mind admitting them and talking about them. Open and uncensored wishes are best seen in children (though children at an early age begin to show repressions). Only tonight I heard a little girl of nine say: "I wish I were a boy and were sixteen years old—I'd marry Ann (her nine-year-old companion)." And recently I heard a boy say to his father: "I wish you would go away forever; then I could marry mother." The spontaneous and uncensored wishes of children gradually disappear as the children take on the speech conventions of the adult. But even though the crassness of the form of expression of the wish disappears with age, there is no reason to suppose that the human organism ever gets to the point where wishes, just as conventional as the

Slips, errors and lapses

above, do not rise to trouble it. Such wishes, though, are immediately repressed; we never harbor them nor do we express them clearly to ourselves in our waking moments. . . .

In social gatherings where there is some slight emotional strain and the customary control over speech is off, we find numberless examples of the expression of the suppressed wish. If we were to make a tabulation of such slips met with in a single week, the list would be long. Most of the slips reveal too much to be put down in print. But I can mention some of the types usually met with.

An elderly bachelor, the friend of the family, squires his friend's wife to a dance. He introduced her as "Mrs. S." (giving her maiden name instead of her married name, "Mrs. J."). If taxed with possessing the wish that the woman were single so that he might have another chance, he would indignantly deny that any such thought had ever crossed his mind. This is probably true in the sense that had any such wish crossed his mind in his ordinary waking moments it would have been put down immediately—repressed. It is rather interesting to note in the above case, which is an actual one, that later in the evening the "Mrs. J." referred to, after having danced with a man other than her escort, shortly afterwards introduced her partner as "Mr. J." (her husband)! It is of course unusual to find material so readily as this. I noted another common type of slip the same day as the above. A woman of my acquaintance had to go to the . . . station to meet three girl friends *en route* from Boston to Washington. She decided to buy some flowers for each of them. I went to the florist shop with her and to my surprise she purchased only two bouquets, saying: "A likes violets, but B is fond of orchids." When we reached the sidewalk I asked her why she disliked "C" so much. "Why do you think I dislike her?" she asked. "Because," I said, "you have done all in your power to annihilate her—you have forgotten to purchase any flowers for her." She showed confusion but gracefully admitted that I had saved her from making a serious *faux pas*. To take revenge, however, she gave me my just deserts by saying: "I can't bear to be around a man who has your

view of life." (She afterwards admitted, however, that "C" had been for many years a thorn in the flesh.)

Slips are often expressive of wishes which bear on the pleasanter side of life. I mislay my cane and umbrella, both of which I prize highly, and find that I left them at the house of a friend where I last had dinner and a game of bridge. The wish shortly to visit so pleasant a place again is very clearly implied. To take a single final example in this connection: Only a moment ago it was necessary for me to call a man on the telephone. I said: "This is Dr. John B. Watson, of the Johns Hopkins Hospital," instead of Johns Hopkins University. One skilled in analysis could easily read into this slight slip the wish that I had gone into medicine instead of into psychology (even this analysis, though, would be far from complete).

Slips of the pen are just as numerous and just as interesting revealers of hidden character as are slips in speech. It is in dreams, however, that we get our most interesting and valuable material for analysis.[1]

Automatic writing

In automatic writing the person writes involuntarily. At times he may not even know what he is writing or that he is writing. Many instances of "mediumistic" writing, as this peculiar and unexplained phenomenon is sometimes called, have come to light in recent years. The following case is an illustration of what sometimes happens in automatic writing:

Violet X was born in New England and lived a normal healthy life as a child. She had excellent schooling, graduating from a college for women. She had no illnesses and never considered herself nervous or hysterical. In college she had the usual courses in psychology. She had been specially interested in sociology and had done some social service work in Boston. She was a teacher of English and later married a professor of English in a western town. She had a fine intellect and a charming personality.

[1] WATSON, JOHN B., "The Psychology of Wish Fulfilment," *Scientific Monthly*, 1916, vol. iii, pp. 479, 481-482.

Just previous to the time of her automatic activity she had worked very hard and had begun to feel run down. The physician she consulted told her she was overtired and had some slight cardiac disturbance. Aside from this condition of fatigue, she appeared to be normal physically and mentally. One day when in this state of fatigue, it was discovered that the Ouija Board was working unusually well for Violet X, and Dr. Richmond was prompted to test her ability to write automatically. This started a series of records which were obtained during a period of several months. The first attempts were not so brilliantly successful, but with repeated attempts a marvelous facility for writing developed and with this an increased tendency to dissociate appeared which finally became so alarming that the experiments were abruptly terminated.

During the period of experimentation no less than seven distinct recurring personalities emerged, together with several minor ones. Each had a name and a handwriting more or less individual. Each spoke of herself or himself in the first person, giving detailed answers to questions, coherent accounts of themselves, and admonitions and advice to the experimenters. Half a dozen different personalities might come at one sitting, interrupting one another unceremoniously, and sometimes even rudely. The personalities, once established, would often appear when called, coming with the remark: "So and so is here, what do you want?" Miss Violet X maintained the same attitude as the other experimenters, questioning or replying to what the hand was writing. Any levity on the part of the subject or the others was apt to call forth scathing remarks from the secondary personalities. Miss X with one exception retained her own personality and was fully aware of what was going on, although she by no means always knew what the hand was writing; but as will be seen, her behaviour was different when the different personalities were asserting themselves. In the following account it must be remembered that they appeared at different times throughout the several months of the experiment and that often several came at one sitting; but they shall be taken up, one at a time.

The first of these personalities to appear and the one who appeared most frequently and had the most to say, was Annie McGinnis. Annie immediately drew a portrait of herself and it was a very clever picture. (In her normal personality Miss X could not draw at all.) Annie's story as she told it at various intervals is the following. Annie was a poor girl who had fallen through no fault of her own, but she had been led astray by a man who had promised her food and shelter and an easier life. After that she became a prostitute and finally died giving birth to a child; she suffered greatly because of her sins and wandered aimlessly about until she found Miss X, with whom she took up her abode "because," as she said, "you are so good, I love to be with you." Annie, true to type, was coarse, rude, quick-tempered, resentful, reckless and passionate. Whenever she appeared, she took charge in a whirlwind fashion, and if she happened to be in a good humor she was a great blarney. Whenever Annie appeared, Miss X would be seized almost as though with a convulsion; her arm would stiffen and the fingers would grip the pencil tightly and write in a coarse, flowing hand; or her feet would pound on the floor while the arm would bang itself on the table with enough force to cause considerable pain. The pounding occurred, Annie said, when she thought of what men had done to her. Annie hated men with large capital letters, and often after one of the male personalities had been recording she would obliterate all traces of these records by scribbling over the entire paper.

During Annie's appearance, Miss X often was observed to have a peculiar expression on her face which grew more marked toward the latter part of the experiment. Her eyebrows were raised and she looked frightened. Sometimes she would grit her teeth and press her lips together firmly.

Mary Patterson was the next personality. Her handwriting was very much like Miss X's normal writing. She used the best English, and in general was more like Miss X's primary personality than any of the others. She came quite seldom, and when she did she was apt to be rather rudely ousted by some of the more

aggressive ones. Mary declared she was Miss X's most familiar spirit.

Mary Minott was a third personality. She described herself as a cosmopolitan and very talented. She hated Mary Patterson and called her a prig, full of puritanical notions. She would bitterly upbraid Miss X for preferring Mary Patterson to her. She insisted that if Miss X would only listen to her she would make her a famous designer (Miss X normally could not do this at all). Mary Minott had a perfect passion for designing gowns and she had talent that amounted almost to genius.

A fourth personality, persistent and always unwelcome to Miss X, was Alton. Unlike the others, he was no myth, but a friend of her *fiancé*, whom she had met the previous summer. He wrote the most sentimental things and seemed to try to dissuade her from marrying the man to whom she was engaged. Alton was always urging Miss X to give herself up to mediumship, saying that the spirits of both the dead and the living could speak through her. He admitted that it was sometimes dangerous but felt he could guard her from harm.

Miss X's father was the other personality who purported to be dead, as he actually was. This personality assumed the actual handwriting of her father. He did not appear often and then only made hurried remarks about family affairs.

A sixth interesting personality labeled himself simply "the Spirit of War and Desolation." This spirit sounded dreadful warnings (it was just prior to America's entry into the war) and urged Miss X to work for the Red Cross. This personality alternately urged Miss X to give up automatic writing and to take up the study of mediumship for which she was told she had rare talent.

The last personality to develop and the one who finally caused the disruption of the experiment, called himself merely "man." In the beginning he was not at all distinct, neither with regard to handwriting nor to the content of what he wrote. At first he would break into some other conversation with totally irrelevant remarks, and when questioned would give only ambiguous answers or none at all. Finally however, he identified himself as

man and would alternate with Alton, but he developed such an antipathy toward Alton that he succeeded in banishing him altogether. He also fostered an intense dislike for Annie McGinnis who hated him in return in letters two inches high. She considered him the incarnation of all her enemies. "Man" tried to banish her, but nothing could banish the flippant and irrepressible Annie and she took particular delight in scribbling all over the things he had written.[1]

Automatic speech

Automatic speech is similar to automatic writing. A physician reports the following observation on himself.

I was suffering from a slight inflammation of the left ear, and was lying in bed, on my left side, prepared to go to sleep. In consequence of the pressure and the pulsation I heard the secretion in the left ear moving with a slight crepitation. It occurred to me to imitate this noise articulately; I therefore gave the necessary impulse to the articulatory muscles and very soon my imitative articulatory motions were produced with extreme rapidity, while I heard them in my ear, *and felt them in my mouth.*[2]

Another physician reports a patient to say:

When I think, I cannot help speaking, or I should choke. Even if I do not speak aloud, if you watch carefully you can always see my lips moving; but this is still more the case when I hear voices out of my belly.[3]

[1] MÜHL, ANITA M., "Automatic Writing as an Indicator of the Fundamental Factors Underlying the Personality." *Journal of Abnormal Psychology,* 1922, vol. xvii, pp. 166-183.

[2] Quoted in TAYLOR, W. S., *Readings in Abnormal Psychology,* p. 433, Appleton, 1926.

[3] *Ibid.,* p. 433.

CHAPTER VII

VOLUNTARY ACTION

Questions this chapter seeks to answer: What is a voluntary act? What is its relationship to habits? What is the significance of voluntary action? What steps are involved in a voluntary act? What is an incentive? Can voluntary action be cultivated? What is will power? What is an abnormal will?

HABITS grow out of reflexes mainly through the indirect, spontaneous influence of the environment. All habits of animals are acquired by this means, as are most of the general character habits of human beings. But human beings possess a unique power which enables them to project themselves into the future, to see themselves as they might be, and to engage deliberately in forms of behavior that will carry out the purpose in view. Such behavior involves the conscious exertion of effort, or effort purposefully directed and controlled. Whenever such effort is present we refer to the behavior as voluntary action. Voluntary action is willed action, chosen action, action that is engaged in for the purpose of bringing about a certain consciously desired end (the formation of a new habit or the single performance of a new act) and toward which all present behavior is directed.

Voluntary action is purposeful action

An understanding of the nature of voluntary action requires an analysis of two factors: first, what it is that is controlled

in the exercise of conscious effort; and second, why it is controlled.

I

THE NATURE OF VOLUNTARY ACTION

When a carpenter starts to build a cabinet, he begins with pieces of lumber which are independent of each other, and out of which the anticipated product is to be shaped. The cabinet is his purpose and the lumber his material. Besides his material and purpose, he has tools with which he acts upon the materials. Now if his purpose is clear to him, and if he has sufficient control over his tools, the result will be that the separate materials become combined into a new product, the properties of which are entirely different from those of the raw materials with which he started.

Voluntary action follows somewhat the above process. Let us consider, by way of illustration, the deliberate formation of a new habit. The habit to be formed is the goal and the existing habits are the materials. The tools by means of which the new habit is to be shaped out of the old are our energies. If these energies are under our control they will operate upon the old separate habits until these become unified into one new type of behavior. When we learn to play the organ we begin with a number of established habits of hands, fingers, and feet, each of which persists in following the old track. These independent movements must be so controlled as ultimately to become unified into one single act in response to a stimulus. As a result of persistent practice—that is, of directed behavior—the accomplished organist need not pay much attention to the movements of his hands on the keyboard,

It is directed behavior

because as soon as notes arranged in a certain order are presented, hands and feet move automatically to the correct position in one coördinated act. The voluntary bringing together of separate habits has yielded a new habit which operates without conscious effort.

Voluntary action is thus a means to an end, the end being the performance of a new act. It is an adjustment to an anticipated situation, or to a situation which is as yet not a reality, but which will become a reality as a result of present activities which are under control. It is an attainment in the making, an accomplishment in the process of formation. Its constituents are habits that are already functioning as independent units, but which become forged together by the fires of directed behavior. Voluntary action wards off the destructive influence of stagnation. It maintains a perennial plasticity in the individual, and enables him to retain control of his actions and to direct them into desirable channels of accomplishment. It keeps the human being human by preventing him from becoming a machine. Voluntary action is one of the powers which man possesses making possible the domination of mind over matter.

Old habits are forged into a new act

II

THE FACTORS OF VOLUNTARY ACTION

Consciously directed effort is exerted when four factors function simultaneously in behavior. These are goal, incentive, judgment and control. The goal is a new act to be performed or a new habit to be established. A goal, however, is in itself insufficient to arouse voluntary action. There must be an incentive of some kind, some driving force, which

urges the individual on to the fulfillment of the goal. This incentive may come from various sources. The objective itself may be so vivid and intense that it becomes its own incentive. The lives of great religious geniuses are outstanding examples of the power of such incentives. To them, God is such a vivid reality that a striving for Him and a union with Him become the sole aim of their existence.

Another type of incentive is the natural interest which we commonly call talent. Talent means a natural aptitude for a certain kind of accomplishment, and its driving power is second only to that of religious inspiration. The driving power of natural interest is responsible for all creative activity in the arts, philosophies, and sciences. The Beethovens, Michael Angelos, the Newtons, and the lesser lights in these and other firmaments, are possessed of a power that appears to utilize them only as channels for its expression. These are the workers whom the world honors for bestowing upon it an ever-increasing harvest of treasures that remains the permanent heritage of generation after generation.

Voluntary action requires an incentive

A lesser type of incentive than either of the above is one which is derived or acquired. A derived incentive has less compelling power than a natural one, since it is induced externally and artificially. It is, nevertheless, an incentive that yields worthy results. One who does not have a native inclination for the sciences will not become originally creative, but by persistent application he may develop an interest in scientific ideas which will make him appreciative of the fruits of the creative mind. Appreciation is next to creation. It is indirect creation. He who understands is but a step beneath him who has created. He may see only as through a glass darkly, but he sees, and is enriched by his

vision. When a college student proclaims that there is nothing to a subject, he is but stating indirectly that he knows nothing about it. Beneath the surface there may be a rich treasure; but to reach it the surface must be removed, and its removal demands application. There is no such thing as nothing to a subject, for if there were nothing to it, it would not exist. Every subject in the hierarchy of knowledge represents a search for something for which a need is felt, and while the search may have yielded little, even that little is significant. To discover that one knows nothing is the first step toward real knowledge. It is granted to man that he can, by deliberate effort, implant interests in himself and thereby increase his store of mental goods. If he fails to use this power of searching, he brings stagnation upon himself. Often the failure to apply oneself to a task is due to a hazy goal. But a goal may become clear as a result of an effort to penetrate beyond the surface, and the incentive increases in intensity as the goal becomes definite.

A very worthy purpose backed by a strong incentive is often nullified by a wrong method of procedure. A scientist in the laboratory may be enthusiastically eager to demonstrate a theory, but he may never attain his goal unless he chooses his apparatus with great care and judgment, and uses it adequately. An employer may desire to introduce a reform which will benefit his employees, but go about it in such a manner that he will arouse their antagonism instead of enlisting their coöperation. A third requisite for effective voluntary action is therefore the ability to evaluate the relative merits of several available pathways, and to choose the one which promises to lead most successfully to the desired end.

Also good judgment

Finally, there must be control of all conditions and acci-

dents that may be encouraged on the road to accomplishment. The tortoise outdistanced the hare because it would not yield to the voices of "ifs," "buts," "onlys," "becauses," tempting it to loaf on the way, but persistently plodded on toward its objective. The worthiest intentions and the best procedures are fruitful only when they are supported by a goodly amount of self-control.

And control

No single one of the four factors of voluntary action is sufficient in itself to bring about a desired result, but each must always function together with the others. There are persons who are always busy but who get nothing done because of the lack of a clear-cut purpose. Others are full of ideas, intentions, and aspirations which remain in a potential state because of an inertia which is permitted to dominate and domineer its victims. Some people blunder about in a maze of by-ways because of a failure to decide at the very outset where they want to go and how they are to get there. Hazy vision of the goal, insufficient incentive, poor judgment and inadequate control are obstructions in the road to success. There can be no constructive outcome to an enterprise unless these are overcome.

All four factors must work together

Voluntary action is subject to cultivation. One can form the habit of exercising controlled, directed action, to displace the more prevalent habit of trusting to chance and circumstances. Unless old habits are constantly lifted out of their ruts and diverted by conscious effort into newly chosen channels, an individual or a group sinks to the level of animal existence. The animal acquires its stock of habits indirectly from the environment in which it dwells. None of its modes of behavior are in any manner due to its own initiative. If its environment remains constant, its repertoire of habits like-

Voluntary action can be cultivated

wise remains unchanged. The animal is thus a slave of the circumstances which surround it, because it is unable to see beyond the present moment. If it had the power of foresight, instead of being merely adaptive, it would become creative because it would evolve new forms of behavior and create a modified environment in keeping with a conscious purpose. Now the whole of civilization is the story of a progressively modified behavior toward a newly created environment. Plagues were once considered to be heavenly chastisements for the sins of mortals. A vision in the mind of a genius, followed by years of arduous voluntary action, brought about a modified attitude, which has saved and prolonged life. A vision in the mind of Newton, and the incentive it generated, created a new heaven and a new behavior toward the heavenly hosts. A vision in the mind of Jesus, and relentless effort in its pursuit, are slowly but surely bringing about the establishment of the kingdom of heaven that dwells potentially in the hearts of men. A vision in the mind of Darwin, and his indefatigable labor, introduced order into the chaos of life and a new attitude toward that life. The character of mankind as a whole which we summarize in the word culture is thus the product of voluntary action.

Similarly, individual character is an outgrowth of the same human power. Character is recognized by a force, a persistence of action, behind which there is discernible a clear purpose of the nature of an ideal. We speak of a strong character in a person when we feel that the activities of the individual are not haphazard and accidental, but guided, directed and controlled by a purpose that commands respect and admiration. Such is the truly virtuous individual—vir-

It is the basis of character

tuous in the generic meaning of the word—the strong, responsible, confidence-inspiring person, who represents the highest type of man the actor.

III

WILL POWER

Many books intended for general consumption appear regularly, pointing out a royal road to what we generally call will power. There is no mystery, however, as to what it is, nor is there a royal road to its cultivation.

One difficulty in understanding will power is that it is mistaken for many things which it is not. Will power is not desire, or exertion of effort, or persistence, or obstinacy. The drug addict has all these; but if there is anything he is lacking in, it is will power. The hall mark of the drug addict is not that he does not control his actions, but that his actions are ruled by a desire which has become a fixed habit.

Will power not a mystery

Will power means controlled directed effort. But directed toward what and controlled for what? Toward the accomplishment of an end? But that is also true of our drug addict. Apparently there is a difference in the ends. Will power is present only when the end is self-determined, consciously and deliberately formulated, premeditated. But even that is not sufficient. There are ends which are self-determined but which are the negative of will power. The woman who plans to murder her husband to make room for a lover has a deliberate end in view. But if she had will power she would not execute her plan. What she is really doing is planning not an end, but a means toward an end. She is planning to satisfy an end, a desire which is already present. She is

It is controlled effort

therefore just like the drug addict. She has desire, effort, but no will power. For will power to be present, the end to be achieved must be of a nature that counteracts already present tendencies or habits. Will power may then be defined as effort directed and controlled toward an end, the accomplishment of which requires the overcoming of present desires and impulses.

Will power in this sense is the outstanding trait of the men and women whom we honor as the builders of civilization. We feel above all that these persons were actuated by a purpose that is constructive and impersonal. We also feel that their daily activities are not haphazard, fortuitous, ruled by accidental circumstances, external forces, immediate necessities, needs or desires, but that they tend toward some one specific goal. Upon this one goal all their energies are concentrated, to the exclusion of all other diverting interests. They pursue this goal, not blindly and indiscriminately, but with a full consciousness and fine judgment as to ways and means. They always know what they are doing and what they are about. They hold themselves responsible for their deeds. They are not driven by a blind force which is beyond their control. They remain human beings instead of becoming machines. The full humanity of a Socrates and a Jesus, a Spinoza or a Galileo, always strikes us and appeals to us as one of their outstanding characteristics. Above all, they never seek excuses and justifications either for deviating from their purpose or for their failures. They never blame circumstances or resort to *ifs* or *buts*. They invariably place the blame where it belongs, namely, upon themselves. Upon discovering their mistakes, they immediately proceed to rectify them.

It is a trait of outstanding personalities

We now see that will power is only a popular name for what psychology calls voluntary action. Its traits are the same we found in voluntary action—a clear purpose, persistent effort, and discriminated behavior. Will power, like any other skill or ability, is an acquired trait, a habit. To create a purpose is to cultivate the habit of seeking understanding. When the student says there is nothing to a subject and therefore there is no use to study, he is hiding his ignorance in sophistication. The real fact in the case is that he knows nothing about it, hence there is nothing to it, and hence he is not interested. But experience teaches us that an initial disinterest may grow into an interest just so soon as we begin to gain some insight and understanding. To generate effort and energy is to learn to get busy.

Will power is a habit

"To learn to control is to practice control until it becomes a habit," wrote William James. Will power, in sum, is the habit of getting busy when there is something to be done, or of finding something worth doing and doing it.

IV

Abnormalities of Will

To be an habitual liar is to have formed the habit of so confusing what is actual and what is only pure phantasy that one can no longer distinguish the difference between what is true and what is false. The purpose of a lie is to achieve some end. So long as the person is aware that the means either to be used or which have been used for obtaining the end are not the actual facts, the lie is normal. But this practice may be engaged in so often that the distinction disappears, in

which case the habit becomes pathological. A pathological lie has been defined by Dr. William Healy as "falsification entirely disproportionate to any discernible end in view engaged in by a person who, at the time of observation, cannot definitely be declared insane, feeble-minded or epileptic." The abnormal liar lies for the sake of lying. He has lost all control of his activity. He is an involuntary falsifier. Behind the habitual liar there is always a history of causes most usually harking back to childhood and culminating in puberty and adolescence. A child begins to lie either because of indistinct memory, fear of punishment, lack of appreciation or too great restraint in play. Each successful lie leads to the next one and to greater skill in the telling, until the habit is so firmly established that it becomes a character trait of the adult.

Fabrication

One serious form of fabrication has been given the name of *mythomania*. There are three kinds of mythomania: vain, malicious and perverse. Vain mythomania is most typical of weak persons, particularly children, who try to compensate for their weakness by exaggerated statements of their importance.

Mythomania

All children are vain, and weak children are particularly so. Most interesting is the case of a twelve-year-old girl who came into school one day and said her mother was ill; every day she gave fresh details on the illness and its progress. She said at last her mother was dead. She stayed away one or two days, and came back crying and dressed in black and gave details of the mother's burial. Some time after she explained her father had married again and gave new details on the wedding ceremony. It appeared unexpectedly that the child's mother was living, had been ill, and lived with her husband. Inquiry proved that the

child had only wanted to be noticed, and wished to wear a black dress that had been promised her for her birthday.[1]

In malicious mythomania the person manufactures vicious tales which involve others in difficulty, such as accusing an innocent person of some crime. A perverse mythomaniac is a psychopath who seeks to satisfy some vicious tendency by imposing upon others.

The case of Thérèse Humbert is most interesting, and shows what an intelligent and clever mythomaniac can realize by fabulation. In this extraordinary case, the highest and cleverest classes of society were completely imposed upon by the effects of an extensive but really absurd suggestion emanating from weak-minded Thérèse, who was gifted with the particular qualities of an active mythomaniac and with remarkable creative power. Of a similar nature was the case which victimized Mr. Carnegie and other financiers.

Over-suggestibility

Suggestion is defined by Professor McDougall as a "process of communication resulting in the acceptance with conviction of the communicated proposition in the absence of logically adequate grounds for its acceptance." As such, suggestion is normal. But there is a difference in the degree of readiness with which a proposition is accepted. Advertising slogans such as "Eventually, why not now?" or "Have you a little Fairy in your home?" are examples of normal suggestion. Here is an example of suggestion in advertising:

Glorious opportunities to get rich quick. Invest in the California Ranching Company now being organized to start a cat ranch in California. We are starting a cat ranch in California with 100,000 cats. Each cat will average 12 kittens a year. The cat skins will

[1] WILLIAMS, TOM A., "Malingering and Simulation of Disease in Warfare," *American Journal of Insanity*, 1921, vol. lxxvii, pp. 572-575.

sell for 30 cents each. One hundred men can skin 5,000 cats a day. We figure a daily net profit of over $10,000.

Now what shall we feed the cats? We shall start a rat ranch next door with 1,000,000 rats. The rats will breed twelve times faster than the cats. So we shall have rats to feed the cats.

Now what shall we feed the rats? We shall feed the rats the carcasses of the cats after they have been skinned.

Now get this. We feed the rats to the cats, and the cats to the rats and get the cat skins for nothing. Shares are selling at 50 cents each, but the price will go up soon. Invest while opportunity knocks at your door.

With the above poster was displayed the following notice:

Some gullible people will try to buy this stock. It is a foolish fake, of course, but no more foolish than many "wild-cat" schemes being promoted today. Investigate before investing. Don't hand over your money to any unknown glib-tongued salesman.[1]

Extreme or abnormal suggestibility is the tendency to accept literally and without question or discrimination whatever one is told, and to act accordingly.

Hypnotism is an artificial increase of suggestibility. In the hypnotic state the person loses all voluntary control of his actions and mental processes and becomes a slave to the suggestions of the hypnotist. The subject is open to suggestions that will induce hallucinations, anæsthesia, muscular rigidity, dreams and hypersensitivity. Thus the person may be told that he is listening to some great singer, and judging by his attitude he seems actually to hear the singing. Or he may be told that his hand is numb, and he will not feel the prick of a pin. He gives no sign of pain. Or he may be told that his arm is

Hypnotism

[1] Quoted in MORGAN, J. J. B., *The Psychology of Abnormal People*, Longmans, Green, 1928, pp. 433-434.

rigid and stiff. He cannot move it until the hypnotist releases him from the suggestion. Or he may possess unusual sensory ability so that he can hear sounds beyond his normal hearing. It may also be suggested to the subject that on waking he will perform a certain act or utter a certain sentence. On waking, these instructions will be followed. This is known as post-hypnotic suggestion. The psychology of the hypnotic sleep is as yet a mystery.

SUMMARY OF PART II

In this section we have traced the nature and development of human behavior, and considered several implications of practical daily significance. Behavior is a general term designating the activities of living organisms. We have native or inborn behavior, and acquired or learned behavior. These two forms of behavior are inclusive rather than exclusive, in that native behavior determines the kind of behavior that can be acquired. Animals which come into the world fully developed, possessing definite forms of behavior, learn least during their post-natal period; while those who come into the world helpless and who have long periods of infancy are most educable, and can acquire the widest variety of behavior. The scope of behavior expands with the evolution of life from the simplest to the most complex living organisms. Man has native behavior, but no instincts, since he is helpless at birth and only gradually acquires all those specific types of actions which enable him to function adequately in any environment.

The original behavior of man consists of a mass of random, chaotic, undifferentiated squirmings, called reflexes. These reflexes gradually become established as orderly, systematized

acts, known as habits. Reflexes are the raw materials of habits. Habits, in their turn, become the building blocks for the highest form of behavior, of which only man is capable—voluntary action, or action consciously directed toward some anticipated end. Voluntary action is creative activity, since by means of it the new develops out of the old and makes for individual advancement and social progress.

PART THREE

The Nature of Intelligence, In General, and Its Development From Sensation to Creative Imagination.

¶ Here we shall study what intelligence is, how it develops from the simple sensations into its highest functioning in creative imagination. We shall also take note of a number of matters of great importance in our daily affairs, how we think, why we think as we do, and how and why our stock of ideas works either constructively or destructively.

CHAPTER VIII

SENSATIONS

Questions this chapter seeks to answer: What is intelligence? What is its relationship to behavior and instinct? Why is this question important? What is sensation? What are the elementary sensations? What characteristics do sensations possess? What are some of the common abnormalities of sensation? What is the place of sensations in knowledge?

I

The Nature of Intelligence

When we examined the nervous system as the mechanism of adjustment, we gave the name of "intelligence" to the mental activity involved in behavior. We found that intelligence and behavior are not separate, but are two phases of one activity, in that behavior is the outer manifestation of intelligence and intelligence the inner phase of behavior. Wherever one is present the other is also functioning, and the one is impossible without the other. Furthermore, a high type of behavior means a high degree of intelligence, and a high degree of intelligence means a high type of behavior. Animals low in the scale of evolution possess only rudimentary nervous systems and are therefore capable of only simple forms of behavior. Man is the most intelligent of animals because he is capable of the widest and most

Intelligence and behavior are one activity

varied kind of behavior, which means that his highly evolved nervous system permits of the most complex forms of mental process. The evolution of the nervous system is therefore the evolution of both intelligence and behavior.

It is of utmost importance to remember the nature of the relationship between intelligence and behavior, in order to avoid confusion. Many writers draw a distinction between instinct and intelligence. They state that instinct is the animal or lower nature in man, and intelligence is the human or higher nature, and that each is involved in a perpetual war with the other. Intelligence is supposed to serve as a sort of guardian or censor over the instincts, to subdue and refine them. This doctrine is not only false in theory, but mischievous in practice. It has served as a justification for the existence of many evils. Thus it is contended that human beings are envious, jealous, pugnacious, and what not, because of the animal instincts in them, but that these undesirable traits may be refined by the exercise of intelligence. Many theories of society, many ethical systems, and many moral preachments, have been based upon this entirely arbitrary distinction.

As has been pointed out in the discussion on behavior, instinct is a general term applied to inborn behavior, in contrast with habit or learned behavior. But native behavior varies in flexibility for different forms of life. In the lowest animals it is most inflexible, in man most plastic and variable. Hence, the learning power of an animal depends upon the state of its native behavior; where native behavior is most rigid and fixed, learning power is most limited. Learning power and intelligence are one and the same thing, the most intelligent animal or individual being the one that can adjust

And so are instinct and intelligence

itself most readily and completely to the widest variety of complex situations. Since, therefore, the most intelligent animal or individual is the one which can learn most in the shortest time, it follows that intelligence and instinct are not conflicting but interdependent. The amount an animal can learn and the rapidity with which it learns are directly dependent upon the state of its inborn behavior. Instinct, intelligence and behavior are therefore inseparable, since the instinctive state determines the degree of adaptability or the kind of behavior, and the degree of adaptability is the criterion for the degree of intelligence.

Similar to the practice of distinguishing between instinct and intelligence is the widespread tendency to contrast intelligence with education. The point of view maintained by many writers is that intelligence means inborn capacity, that this capacity determines the degree to which one will profit by education or training, and that when this capacity is exhausted further education is of little or no value. One writer says that intelligence is "the thing that enables a man to get along without education," and education "appears to be probably the thing that enables a man to get along without the use of his intelligence." Intelligence is "the inborn capacity of a man to meet a new situation" and "education likely has little influence in increasing it." Within the past decade an immense literature has grown up in this country which points out the sad intellectual plight of the American populace as revealed by the intelligence test. The results of these tests are supposed to indicate that about sixty million persons have no sense, about fifteen million have a little sense, about ten million have fairly good sense, and about five million have superior sense. There is not a particle of doubt that the per-

And also intelligence and education

sons who make these estimates belong to the five-million group!

What is the relation between education and intelligence?

The answer should be very apparent. The sole evidence of a person's intelligence is what he can actually do, and whatever an individual can do he has learned to do. If one person can do more work of good quality in a given time than can another, the former is judged to be more intelligent. But he was not born with the ability to do that work. He acquired it. It is the result of his education. One's education is, then, the only measure of one's intelligence. There is no way of ascertaining how much intelligence an infant has except by what it actually learns to do. We say that the infant is more intelligent than the kitten simply because we know by experience that the child will be able to learn more than the cat will.

Furthermore, education increases intelligence, since it is through education only that one is enabled to do more as well as to do it better. The results of the intelligence tests indicate nothing more or less than actual accomplishment, that is, the results of education. Of course, persons differ in what they can do and in how well they can do it, and hence, differ in intelligence. It would be absurd to deny the existence of such differences. This simply means, however, that education has different effects upon different persons in kind and degree, due to differences in their constitutional make-up. The fact remains, that whatever individuals accomplish is the result of their education, and their intelligence is gauged by their accomplishments. What has been neglected in discussions on intelligence and is responsible for the notion of native intellectual capacity and its effect on education, is the

time element, namely, that individuals differ in the amount they can acquire within a given time. This does not mean that human beings are born with a limited capacity beyond which education is futile, but only that one person will gain more within a certain interval of time than will another. So long as human beings have life they can learn, but some must exert more effort and will progress more slowly than others. The slow learner is more easily discouraged and gives up more quickly than the rapid learner. This is erroneously interpreted to mean that the slow learner has exhausted his capacity because of a limited inborn intellectual aptitude. It may, and probably does mean only, however, that he has given up trying because of slow progress, while the rapid learner perseveres because he is encouraged by the substantial results he obtains.

Having cleared away these misconceptions regarding the general nature of intelligence, we can proceed with an analysis of mental activity as we did with muscular activity.

II

THE BEGINNING OF INTELLIGENCE: SENSATIONS

Sensations are the elementary native units of mental experience. They constitute the first mental response to a stimulus acting upon some sense organ. What we get directly and immediately from any stimulus before us is a number of sensory experiences, visual, auditory, etc. These direct experiences, these first contacts of mind with matter, are sensations. A sensation is thus the psychological aspect or consequence of the excitation of a sensory area or areas of the brain. In other words, a sensation is that which I directly experience,

Sensations are the beginning of intelligence

that which I first become aware of, when the sensory areas of the brain are aroused to activity by some stimulus acting upon a sense organ. When the occipital area is excited I get some visual sensations, when the temporal area is activated, I have some auditory sensations, and so on.

Since sensations are the beginning of mental life, they are therefore also the beginnings of knowledge, the units out of which knowledge is built up. Let us see what this means, by considering a single instance of knowledge.

They are the raw material of knowledge

The statement, "this is a chair," is a case of knowledge. The evidence that the verbal response, "this is a chair," constitutes knowledge is that I adjust myself to the situation in a certain specific manner different from my adjustment to other situations. Knowledge is not a "state of mind" but a mode of behavior, either explicit (overt action) or implicit (language). My knowledge, "this is a chair," involves two consecutive processes: (1) my becoming aware of a number of impressions that come to me *at this moment* from the outside; and (2) my interpretation of these impressions in terms of my past experience as being a certain object. If I did not get the impressions there would be nothing to interpret, that is, I would have no knowledge to issue in behavior. What is meant by interpretation we shall see in the next chapter. For the present we are interested in sensation. Sensation is the name we give to the immediate impressions of which we become aware when a stimulus is present before us and before these impressions have been interpreted as some one specific object or occurrence, that is, before the impressions have become knowledge. Sensations are the rudimentary, vague experiences, which later become clarified into specific facts of knowledge.

Sensations are thus to intelligence what reflexes are to behavior. A sensation is the simplest form of mental activity, as the reflex is the simplest form of muscular activity. And just as all higher forms of behavior are developed from reflexes, so all higher forms of mental functioning have for their raw material the elementary sensations. Similarly, just as the muscular activities of the new-born infant are vague, chaotic twitchings and squirmings, so its mental life must be, in the words of William James, "a big booming, buzzing confusion" of sensations. At least for several days it must be in a state of semi-stupor from which it gradually emerges as out of an incoherent dream. The child has eyes, sees everything, and yet it sees nothing; it has ears, hears everything, and yet it hears nothing, just as it has muscles, twitches all over, yet touches nothing except by chance, and gets nowhere except thumping its head or falling off the bed. It is in a state of chaos out of which order gradually emerges.

III

THE ELEMENTARY SENSATIONS: THE ELEMENTS OF KNOWLEDGE

In the discussion on the sense organs and their stimuli, we noted the kinds of general experience to which each sense organ gives rise. Every general experience is a complex of several specific sensations. Thus, when we hear a sound we do not get one sensation but a large number of sensations which we lump together as a single experience. We shall now turn to an analysis of these general experiences into their component sensations.

The physical stimulus of sound is an air wave. Now an air wave possesses several characteristics, each of which gives rise

Auditory sensations

to a particular auditory sensation of sound. Thus, a sound which lasts long enough and is sufficiently simple to be analyzed by the ear is called a *tone*, while a sound too short in duration or too complex in structure to be readily analyzed is termed a *noise*. However, since individuals differ in auditory power, it happens that what is a noise to one person may be a tone to another. It is the structure of one's ear that decides whether a certain wave will be a noise or a tone. A wave also has a special *frequency*, or a certain number of cycles per second. Frequency gives the sensation of *pitch*. Pitch is what is meant when we refer to a sound as being high or low. Then a wave has *amplitude*. Amplitude is the distance between the crest and the trough of a wave cycle. Amplitude is the basis for the sensation of *intensity* or loudness. The larger the amplitude, the louder the tone. Waves also differ in complexity of structure. Some waves are made up of one single frequency; others are a compound of two or more frequencies. A tone emitted by the human voice or any musical instrument is never composed of only one frequency, but of many frequencies blending together to give a single sensation. That is, a string or a column of air vibrate not only as a whole but also in parts or segments, each segment producing a different pitch, but all the various pitches fusing into a single tone. The lowest frequency or pitch is the tone we hear, and is called the fundamental. The component frequencies are known as overtones or partial tones. This characteristic of waves produces the sensation of *timbre*, or tonal quality. When we speak of a tone as being smooth or rough, pleasant or unpleasant, we are referring to its timbre. It is supposed that timbre depends upon the number and the relative intensities of the overtones in a wave. A fur-

ther sound sensation is *volume*, or the carrying power of a sound. The male voice, for instance, which is one octave—or eight tones—lower in pitch than the female voice, has also more volume. Then there is *extensity*, or the amount of space that a sound covers. A very low tone gives the impression of occupying much more space than one very high, which seems to come to a sharp point.

Sensations of vision are either of *hue* (color), or of *light*, or of a combination of hue and light, which gives two more visual sensations, *brightness* and *chroma*. Hue is the range of color sensations of the spectrum, ranging from infra-red to ultra-violet. The *elementary* or *primary* hue sensations are considered to be red, green, blue and yellow. This means that all the other hues are mixtures of two or more of the primary hues. *Light* covers the range of sensations from *dark*, through *gray*, to *white*. *Brightness* (also called value) refers to how light or dark a hue is. It is the degree of light that a hue has. A shift from light to dark or *vice versa* changes the value of a hue. The hues of the spectrum vary considerably in value—from yellow, which has the highest value, to dark purple, which is lowest in value. *Chroma* is the strength of a hue, the amount of a certain shade of gray that it contains. It is the departure of a hue from gray. When farthest away from gray the chroma is at its fullest strength. When a hue is at its fullest strength it is said to be at the point of saturation. Hues differ in chroma as they do in value. A red pigment, for instance, has twice the strength of a blue-green pigment. Nor do all hues reach their maximum saturation point at the same level of brightness. Yellow reaches its highest saturation at a level of brightness considerably above that of purple-blue. *Complementary* colors are hues that neutralize each

Visual sensations

other, producing a gray in place of another hue. If the spectral band is arranged in a circle the complementary colors will occur opposite each other.

Other sensations

The elementary odor sensations are spicy, flowery, fruity, scorched, resinous, and foul. Those of taste are sweet, sour, bitter, and salty. Touch gives the sensations of pressure, hot, cold, and pain. From the muscles we get the sensations of strain and movement. The static sensations are equilibrium and dizziness, while from the viscera we obtain sensations of pleasantness, unpleasantness, and pain.

IV

ATTRIBUTES OF SENSATION

It is a characteristic of all sensations that they do not occur simply as sensations, but are accompanied by experiences which are not an essential part of them, but of which they are the cause and by which they are affected in a significant way. These attributes are *feeling—tone, degree of intensity, duration, after-effect, contrast, synæsthesia,* and *accommodation.*

All sensations have feeling-tone

Every sensation is not only one experience but two, one cognitive and the other affective. A tone is not only something I hear, but something that I feel as pleasant or unpleasant. I not only taste an article of food, but feel it to be good or bad. The feeling-tone of sensation is particularly prominent in tastes and odors. In taste, for instance, the words sour, sweet, salty, and bitter refer more to the feeling effect of the sensations than to the sensations themselves. This is not so true of hearing and vision, probably due to the fact that taste and odor are biologically more basic functions than hearing and vision. An animal could survive without hearing

and vision more readily than without tasting and smelling. But every sensation generates a feeling, and it is the feeling that determines the final reaction. Feeling colors sensations and tells the animal whether the situation that evoked the sensation is for its weal or woe.

Every sensation occurs with a certain degree of intensity which influences the kind of effect that the sensation produces. A soft tone or a faint odor may be pleasant, but it may become unpleasant when very intense. Intensity also affects awareness, reaction and retention. A faint sensation will be disregarded, or even if attended to, will soon pass away; while the same sensation, if more intense, will force attention and be retained. This fact is made good use of in advertising. Vivid impressions are produced by the use of clever phrases ("99 44/100% pure," "It floats," "Is there a little Fairy in your home?"), novel words (Odorono, Zip), screaming statements ("The biggest show on earth," "Discover your hidden powers"). By vividness you can fool all the people some of the time and some of the people all the time.

Intensity

An intense sensation of brief duration may be agreeable, but it may become disagreeable and even unendurable if prolonged. But the same sensation, if faint, may be unpleasant if too short and pleasant if prolonged. In the first case there is too much of a good thing; in the second, there is not enough.

Duration

After-effects or after-sensations refer to the property of a sensation present after the stimulus has been removed. The sense organ, once activated, persists in action even after the stimulus is no longer present. In vision there occur negative and positive after-effects. If we gaze steadily at a red object for fifteen or twenty seconds and then look at a medium gray

After-sensations

background, we get a sensation of green, the complementary color of red. This is a negative after-sensation. The positive after-effect is like the original sensation, only less vivid. All sensations leave after-effects, only that in some sense organs they are more easily discerned than in others. The strong, sweet odor experienced on first entering an orange grove becomes "sickly." A substance that is very sweet often leaves a sour after-taste.

Contrast

Go from a very dark room to one dimly lit, and it will appear brighter than it actually is. Go from a brightly lit room to one that is dim and it will appear pitch dark. A tone heard alone may be pleasant, but when heard in contrast with a tone of much superior timbre it sounds "sour." A sweet substance loses its sweetness when tasted after a much sweeter one. The sensation is affected by what preceded or followed it. This is successive contrast. Put two persons side by side, one tall and the other short, and the tall one will appear very tall and the short one very short. Lift two weights together, one heavy and the other light, and the heavy one will be heavier and the light one lighter than when lifted singly. Expose two pieces of the same gray paper, one on a white background, another on a black background, and the piece on the black background will look brighter than that on the white background. These are instances of simultaneous contrast.

Synæsthesia

In synæsthesia a sensation from one sense organ arouses a sensation in another sense organ. This phenomenon may be called a case of sensory-neural sympathetic vibration. The most common occurrence of synæsthesia is so-called colored-hearing. For certain persons, every tone suggests a certain color and every color suggests a certain tone.

It is also a common practice to describe one sensation in terms of another. We speak of rough, smooth, sweet, sour, bright, dark, tones; of sharp and dull tastes, of warm and cold colors, of heavy odors, and even of slippery, smooth characters. Similes such as "he is bright as a dollar" or "keen as a razor" are also instances of synæsthesia.

Enter a dark room after having been in the light and you will see nothing. Stay in the room a while and you begin to see. Stay in a room in which there is a pungent odor and you stop smelling it. Continue eating sweets and they lose their sweetness. Keep on pressing on a certain surface of the skin and you eventually cease to feel the contact. Place your finger in very hot water and if you can keep it there for a while, the sensation will become one of coolness. Men who work steadily in very noisy plants eventually do not hear the noise. These are all instances of accommodation. Accommodation seems to be a provision of nature for the welfare of the organism. If the men in the noisy factory could not "forget" the noise, they might develop some serious nervous disturbances. Nature saves us from the agony of a drowsy monotonous speaker by putting us to sleep or by diverting attention into more pleasant channels.

Accommodation

V

Abnormalities of Sensation

The most common forms of abnormalities of sensation are due to deficient sense organs, such as deafness, or color blindness, or myopia. But the most troublesome of sensation disturbances are psychological in nature, such as anæsthesia and

Anæsthesia and hyperæsthesia

hyperæsthesia. In anæsthesia sensitivity is decreased or disappears completely, while in hyperæsthesia it is increased above normal. Every type of sensory experience is subject to disturbances. In the realm of vision there is anæsthesia or blindness for some particular object, and hyperæsthesia, or increased acuity of vision, sometimes accompanied by fear of light (photophobia). There is also a visual disturbance known as photomata, in which the patient has sensations of flashes of light, sparks, or colors that have no objective basis.

The most common form of auditory anæsthesia is hysterical deafness. Auditory hyperæsthesia manifests itself in unusual discomfort and annoyance at sounds. Buzzing, ringing, roaring, or explosive sounds felt in the ears or head are another common form of auditory disturbance. Similar disturbances occur in all other fields of sensation.

A unique characteristic of these disturbances is that they are very sporadic. They come and go without any apparent cause. In hysteric fits they are modified, either increased or decreased, or disappear altogether only to come back when the fit is over. At times they disappear during normal sleep. Certain drugs, such as alcohol, chloroform and morphine, often cause them to vanish. They are also affected by suggestion. Dr. Morgan cites such a case from the patients of Dr. Janet.

> Several years ago, we made the following observation of a patient . . . who presented a state of total anæsthesia. We used to treat her legs with electricity, and noticed the strong muscular contractions she experienced at each contact of the negative electrode, when all at once we saw that the two wires which fastened the plugs to the apparatus had dropped. For a long time we had thus been applying electricity with mere pieces of wood.

We continued without fastening the wires to the ends, and the contractions were all the greater by the simple contact of the plug.[1]

VI

SENSATIONS AND KNOWLEDGE

Before undertaking the study of how sensations become knowledge, it will be well for us to gather up the various threads on the nature and significance of sensations.

Sensation is seeing, hearing, tasting, etc., before seeing, hearing, and tasting have become knowledge of what is being heard or seen or tasted. Sensation is *a happening* which becomes *the happening*. What I now hear as *a sound* becomes *the sound* of a violin or piano or cornet. The sensation is *a sound*, while the knowledge is *the sound*. Sensations are therefore not knowledge. Getting only sensations in walking across a busy street would be of little value to us, unless the sensations were interpreted to mean street cars and automobiles and truck drivers. But sensations are the sources and materials of knowledge, since without them there would be nothing to interpret, nothing that could be converted into knowledge. Sensations are independent of past experience, while knowledge *is* past experience. Knowledge consists of something happening to the sensations as a result of past experience. All mental experiences are therefore basically sensation experiences. Resorting to an analogy, we may say that sensations are to knowledge what atoms are to matter.

Sensations are not knowledge

Chemistry tells us that all matter consists basically of some 92 kinds of elements or atoms, such as oxygen, hydrogen, carbon, etc. These atoms combined in different propor-

[1] MORGAN, J. J. B., *op. cit.*, p. 63.

tions give us the great variety of objects existing about us. Thus one atom of oxygen combined with two atoms of hydrogen is water, while two atoms of oxygen combined with two atoms of hydrogen is peroxide; one atom of carbon combines with one atom of oxygen into carbon monoxide, a poisonous gas, while one atom of carbon combines with two atoms of oxygen into carbon dioxide, which, when dissolved in water, makes carbonated water for drinking. Furthermore, the compound formed out of the elements possesses properties that differ entirely from the properties of the elements. A piece of sodium dropped into water will decompose it; and chlorine is a poisonous gas. But the combination of sodium and chlorine is "table" salt, which neither decomposes soup nor makes it poisonous. Similarly, the great variety of mental compounds, or ideas, is formed out of a limited number of mental elements, sensations; and the ideas are quite different from the sensations that enter into their making. Again, a certain number of sensations may form one kind of idea, while another number of the same kind of sensations will result in quite a different idea. Ordinary experience teaches us that our attitudes toward things are determined by the amount of knowledge and the kind of knowledge we possess about them. My judgment of a person depends upon how much I know about him and how well-founded my knowledge is; and my opinion is bound to change as my knowledge changes. Every judgment is as much a judgment of the person who makes it as of the subject judged. Psychologically these facts simply mean that the nature of an idea is determined by the number and kind of sensations out of which it is formed, that the idea is no better or fuller than are its component sensations.

No sensation ever occurs alone, but always in association with other sensations. A tonal sensation has qualities of pitch, intensity, duration, quality, and volume. In addition to these qualities of its own kind, a tonal sensation "suggests" sensations from a sphere besides its own. Thus a tone is often characterized as sweet, rough, smooth, dark, bright, which are strictly sensations of taste, touch and vision. The vision of an article of food arouses sensations of taste and smell. An odor is often spoken of as sour or sweet, delicate or heavy. Any one experience thus has for its raw stuff sensations coming from several or all sense organs. But all knowledge is nevertheless built out of these elementary sensations, and we can never know anything that is not first based upon sensation.

Now the mental process by means of which sensations become knowledge as a result of past experience is called perception.

CHAPTER IX

PERCEPTION

Questions this chapter seeks to answer: How is knowledge obtained from sensations? From where do sensations get their meaning? What is language? What is a fact? What is a value? What are the sources of differences in meaning? Why do we disagree? Why do we quarrel about our differences of opinion? From where do we get our percepts or ideas? What is science, philosophy, ethics, morality, beauty, religion? What are some abnormalities of perception?

I

The Nature of Percepts

How do sensations result in knowledge or understanding? When I say that I understand a person, I mean that I am familiar with the facts that characterize him, the peculiar traits, desires and hopes that motivate his actions and constitute his personality. I understand physics or psychology when I have an acquaintance with the facts that each of them has succeeded in establishing. To understand is to differentiate, and to differentiate is to recognize those properties of a thing that make it what it is. If I mention the words *physics, chemistry, astronomy, psychology*, etc., to two persons, one of whom has studied these subjects and the other of whom has never heard of them, the difference be-

Percepts are mental habits

tween the reactions of the two will be that to one person these terms have a specific meaning, each different from the others, while to the other they convey no definite meaning, and may be anything at all. The former has percepts, definite ideas, while the latter receives only sensations of sound, or vague auditory impressions.

A percept is a definite mental attitude toward some situation, as a habit is a definite muscular reaction to a situation. Every habit includes a percept, since, if the nature of a situation were not clear, the behavior toward it would likewise be indefinite. The behavior of an animal or of a human being in a strange situation is random because the knowledge of the situation is vague. A layman's definition of physics will be general, exploratory, rambling, as compared with the unhesitating, direct terms of the physicist. The effectiveness or completeness of an act is in proportion to the amount of specific knowledge, or perception, that is behind it. Habits and percepts have the same genesis and obey the same laws as simultaneous neural and muscular activities.

a.—THE PROCESS OF PERCEPTION

Let us take the percept *mother*, and examine the factors that must be involved in its genesis in the child mind. The child has the *percept* mother long before it can utter the *word* mother. We know that the child knows mother because its behavior, whenever this stimulus appears, is different from its behavior in the presence of other stimuli. That is, so soon as the infant begins to react in a definite manner to a definite situation, it *knows* that situation. So long as its reactions to a situation are vague, chaotic and general, we know that

it does not know that situation. When its behavior begins to be orderly and systematic it begins to know. We judge the growth of knowledge in the child by its behavior as we do that of animals in general. Language is but an additional mode of behavior in human beings, indicating the presence of knowledge. But language presents problems of its own which will be considered presently. Our concern now is to analyze out the elements that enter into the making of a percept, the steps in percept formation.

There are three steps in the formation of a percept

In the behavior of the child toward *mother* we can recognize three factors. First, since it acts in a characteristic way in the presence of this stimulus, we know that it differentiates between this stimulus and other stimuli. Second, when it cries because of hunger and prefers mother to any other person, we have an indication that it also interprets this object in terms of its relationship, its use, its meaning to itself. Third, since its behavior indicates a preference for this stimulus over other stimuli, we see that it knows not only the *difference* between this object and other objects, and the *meaning* of this object as contrasted with other objects, but also the *value* of this object in contra-distinction to other objects. Hence we discover three processes which function in the formation of percepts. They are *differentiation, interpretation,* and *evaluation.* A percept must begin with differentiation, for without the awareness of difference there would be nothing to interpret. Likewise, evaluation must be based upon interpretation, since it is not the object in itself that is evaluated, but the usefulness of the object to some person. The sequence in the process of percept formation is then as follows:

1. "This is an object," (as *different* from other objects).

2. "This object is a *chair*," (as object to *sit* in).
3. "This object is a good chair," (as object *comfortable* to sit in).

We must now turn to an examination of the nature of these three perceptual processes.

The process of differentiation need not detain us long. We have already seen in the examination of the genesis of habits that a habit means an acquired coördination of reflexes. Similarly, a percept is an acquired coördination of sensations. The original raw material of the finished percept, *mother*, is a mass of fragmentary sensations, visual, auditory, tactual, olfactory, gustatory, and all other impressions. Since all these sensations occur together, either in sequence or simultaneously, every time that *mother* appears, they become integrated in time as representing one object, as contrasted with a different mass of sensations, which ultimately becomes coordinated to represent another object, say, *father*. The process of differentiation is an ordering of a chaos of sensations into discrete units or objects, each unit being made up of a mass of coördinated sensations.

Differentiation

The processes of interpretation and evaluation will detain us for considerable time. These processes give rise to the *meanings* that things have for us; and since it is the meanings of things that determine our behavior toward them, the analysis of interpretation and evaluation is the central point in the study of mental experience. Whatever a situation means to a person, as a certain object having a certain value, determines the adjustment that is made to it. People make different adjustments to the same situation because they interpret and evaluate it differently. A living organism must react to

Interpretation and evaluation

things in some way in order to live. To react to a thing in a certain way is to assign to it certain properties. These assigned properties constitute the meaning of the thing. In order to understand, therefore, what meaning is, we must examine the sources of interpretation and evaluation, or, in other words, what it is that enables us to respond to a number of coördinated sensations in a specific and adequate manner. And we must consider two types of meaning, those that arise out of interpretation, which we shall call *fact-meanings* ("this is a *chair*") and those that are due to evaluation, which we shall name *value-meanings* ("this is a *comfortable* chair"). Again, we have noticed before that we indicate what a situation means to us either by some observable behavior or by some verbal statement. Meaning may therefore be treated *objectively* as a relationship between things and acts, and *subjectively* as a relationship between things and words.

b.—THE MEANING OF MEANING

Meaning as Behavior.—We have knowledge of a thing whenever the thing calls forth the same or similar behavior on repeated presentations. The child knows fire when it avoids it consistently. It knows a knife from a fork when it uses each of them in a particular manner on successive occasions. It knows a hat from a shoe when it invariably puts the one on its head and the other on its foot. Knowledge is present when a certain stimulus becomes a *sign* for a certain act. A new-born chick will at first peck at any object—pebbles, insects of offensive taste, and even at its own feet. But this random behavior goes on only for a short time. Before many days it will peck only at edible substances. Objects are now

A situation is a sign for behavior

discriminated between, and behavior is selective. They are now signs for engaging in the act or refraining from it. They now mean to peck or not to peck. A hungry rat is placed before a food box having two entrances. One entrance is dark and the other bright. Whenever the rat tries to reach the food via the dark entrance he gets an electric shock. When he takes the bright entrance he gets the food. After several trials the animal avoids the dark entrance. The light has become a sign for the way of obtaining the food, and the way of obtaining the food is the meaning of the sign. From these facts we see that interpretation and evaluation are mental processes in the course of which, and by means of which, a situation gets to be a *sign* for a definite form of behavior. The behavior *is* the interpretation and evaluation of the situation or, in other words, its *meaning*.

Meaning as Language.—For human beings language is the most common way of indicating meaning, and it therefore deserves special attention in the study of perception.

Many peculiar notions, even superstitions, are widespread as to the power and significance of language. These must be cleared away before the true nature of language can be indicated.

Language is a utility, an acquired tool, and not some divine gift bestowed upon man as a special prerogative or privilege. It is one of the forms of behavior that man possesses above infra-human animals, due to his place in evolution. It is simply one of the many habits possessed by man above other animals because of his more highly organized nervous system. Language is an acquired form of behavior, a tool of adjustment. A child forms language habits as it does other habits. It is not born with a language, it acquires

Language is an acquired tool

one, either indirectly from the environment or directly by instruction. The very fact that children invent a language of their own before they learn to speak that of their parents indicates that language is a means for meeting a situation, for satisfying a need. There is nothing supernatural about it.

Again, there is no inherent connection between a word and what the word indicates. A name is not a part of the thing or object that it names. There is a story about two philologists who were discussing sight and vision as synonymous terms. One insisted that the two words could be used interchangeably, while the other maintained that they were not alike in meaning. The latter finally proved his point by an illustration: "I walk in the park with a girl and meet you with a girl. My girl is a vision, yours is a sight." The name here, as in all other cases, is not a part of the object it describes but more so of the person using the name.

Then there is the notion that words in themselves mean something. This notion regarding the inherent meaning of words arises from the fact that we actually do use words, and can use them, without their meaning anything to us. Socrates was put to death because he insisted that people define the words they used. Since they could not do so he aroused their indignation by proving to them that all they did was to utter empty sounds. Supposing I assert: "The gostak distims the doshes." The statement means nothing, but it gives the impression of stating a fact. If I were to ask someone what the statement meant, he could say, "It means that the doshes are distimmed by the gostak, and that when a gostak and a dosh come together the dosh is distimmed." There is therefore a cause and effect relationship between gostaks and doshes, etc., etc. Again, if doshes are a species

Sounds have no meaning in themselves

of galloons, then it follows that some galloons are distimmed by gostaks. A great many arguments are precisely of this nature, and even some students' definitions of psychology or any other science. We learn the definition, that is, the sounds, and we utter them in an impressive manner when they mean nothing to us. There is nothing one may not say so long as one's vocal organs are intact, but what one utters does not necessarily mean anything.

There is also a widespread belief in the occult power of words as words, that a sound can exert some mysterious influence upon oneself, upon others, or upon nature. The whole field of magic is a case in point. Witchcraft is another. To obtain the name of a person is to gain control over him. Some persons suffering from some ailment believe that if they can get hold of the name of the disease they obtain control over it. We seek to avenge ourselves on people by calling them some such names as bolsheviks, radicals, anarchists, in order to hurt them. Social workers, and even some physicians, believe that if they have classified an abnormality under some name they have gone a long way toward curing it. "Give a dog a bad name and hang him" is a most apt commentary on this superstition about words.

Words are also used as a means of self-deception and to deceive others. We use big words to produce an impression. We memorize high-sounding phrases and learn to prattle glibly about science, art and philosophy, by convenient "get intelligent quick" schemes to attract admiration. We repeat, "Every day in every way I am getting better and better," in order to lift ourselves by our bootstraps and give ourselves false courage. We utter fine sentiments and verbal bromides

because they are considered "right," in order to be "nice people."

What, then, is a word? What is its relationship to things? What is the source of the meaning of words, whether the words indicate facts or values, ideas or feelings?

Some very apparent facts about words will give us a hint as to their nature. We recognize the truth of the saying that "a rose by any other name would smell as sweet," which suggests, as has already been indicated, that there is no inherent relationship between a name and the object named. Likewise the adage, "As you think, so you are," suggests that there is no inevitable connection between what one utters and what one actually is. The glib use of such words as beauty, truth, goodness, and the hemming and hawing that follows a demand for their definition, are an indication that words and knowledge do not necessarily go hand in hand. In the Book of Job, when the young man is eloquently revealing his wisdom to the stricken man, a voice from the void warns him not to confuse counsel with words without knowledge. Words, as Bacon pointed out, may become mere idols of the market place. Most quarrels and arguments arise from a failure to define words. Several persons use the same word with different meanings, and then conclude that "after all, it is but a matter of words." But it cannot be a mere matter of words, or the most glib talker would be the most learned of persons. Since several persons use the same word but mean different things, the word has no meaning in itself but derives its meaning from somewhere and is then used as a sign for that meaning. The words "atomic theory" mean nothing but a "sound" to a great many persons, or they may come to mean several different things to several persons, but

No inherent relationship between words and things

to the chemist they mean but one thing. The sound "wousin" can come to mean a negro in transit over a rail-fence with a melon under his arm.

The nature of language then reduces itself to a consideration of how a sound, which is a series of auditory sensations, and hence has no meaning other than a sound in itself, becomes clothed with meaning.

Sensations, as we have seen, become interpreted, assume meaning, because of the cumulative, recurrent effects of past experience. When a series of coördinated sounds becomes a substitute for, a record of, past experience, the sounds constitute a word, and a correlated series of such sound records is a sentence. "We do not often have occasion to speak, as of an indivisible whole, of the group of phenomena involved or connected in the transit of a negro over a rail-fence with a melon under his arm, while if this collocation of phenomena were of frequent occurrence, and if we did have occasion to speak of it often, and if its happening were likely to affect the money market, we should have some name, as 'wousin,' to denote it by." [1] A word is not the object or the experience that it refers to. It does not represent the *object*, but the acquired *responses* to the object. The *meaning* of the word is not the object, but the effect produced on the person who utters the word, or the person to whom it is uttered. A word is a *reminder* of the past responses that have gathered around the correlated sound. A word is a rallying point for past events.

But what is it basically that gives words their meaning? A word is the shadow of an act, said Democritus. Words may

[1] OGDEN, C. K., and RICHARDS, I. A., *The Meaning of Meaning,* Harcourt, Brace & Co., 1923, p. 131.

cause the face to flush, the hand to clench, or the body as a whole to be agitated. A word represents, or is a substitute for, the bodily responses evoked by a situation. If such incipient responses as mentioned above were to be fully carried out, they would be exact reproductions of the original behavior. Even in reading an account of happenings in a novel we pity or accuse or approve or get angry, all of which mental experiences have for their foundations neural-muscular processes or incipient bodily movements. As one writer puts it:

A word is a record of experiences

> The emotions which a thrilling narrative arouses are substitutes for the overt activity which the auditor might be expected to manifest were he actually a participant in the scene described. When, then, we say that a dramatic situation *moves* us, the description is absolutely accurate. Indeed, from the most credible scientific evidence we possess, the emotions which are thus aroused are characterized by all the organic stresses and strains which are present in the most violent overt activity of which we are capable. We inwardly writhe and tussle, we half-start one kind of positive behavior, only to find it checked by the initiation of its opposite,—in a word, we display on a small scale all the conduct appropriate to the situation. And this elaborate arousal to activity is, we undertake to say, precisely what gives every dramatic scene or narrative its meaning.[1]

When a word does not stimulate activity, it has no meaning. It is just an empty sound. We have numerous examples of such empty sounds which many of us use but which mean nothing: "mankind, beauty, moral law, faith." They sound nice, but imply nothing. There is no actual experience, behavior, behind them; hence the words do not arouse incipient activity, and they *mean* nothing. When the word for chair is pronounced in a foreign language it means nothing

[1] GIVLER, ROBERT G., *The Ethics of Hercules,* Knopf, 1924, p. 20.

because it does not arouse a tendency to behavior such as is present when we are confronted by a chair. We give an empty definition of a word, or the definition we read is meaningless, because it arouses no experience in us of a past occurrence or act. It is because of this fact that formal education is so often ineffective. It consists mostly of so many sounds we have memorized.

Let us borrow an illustration from Professor Fite which brings out excellently this motor basis of meaning in language. He writes:

> You may easily say on first acquaintance that this woman is wonderfully beautiful, while yet you know her to be treacherous and false. There is nothing that we may not *say* while the vocal organs remain unimpaired. "Beautiful" and "treacherous and false" are thus far, for you only a word and a phrase. The question is whether beauty will be an experience after "treacherous and false" has also become an experience.
>
> And for the answer we need not quite passively wait for the bitter experience. We may try what Royce called a "thought-experiment," or an experiment in imagination—where, I suspect, the decisive experiments are usually performed. As one form of experiment I will propose that you take the following sentences:
>
> A lovely and beautiful woman.
> A beautiful woman, but what a liar!
> A beautiful woman, but stupid as a beast!
>
> Then ask yourself whether these three women are equally beautiful and equally likely to remain beautiful upon further acquaintance.
>
> To carry out the experiment I will ask my male reader to suppose that by some mischance he had married the second or the third of these beautiful women. Is it a bad guess that after a year or two we should find him contemplating with ironical amusement the fact that other men thought her beautiful? On the other

hand, suppose a man to have married a beautiful woman with a rather disreputable "past" and then to have found in her a loyal wife, an intelligent and sympathetic companion: must we not suppose that any jealous bitterness with regard to her past will be modified, at least, by the thought that it was a tribute to her loveliness? [1]

The bodily basis of the *meaning* of words is thus the tendency to motor activities or incipient muscular sets that they arouse. The response to the word is an incipient movement which is a slight, incomplete repetition of the gross or complete movement made in the past to a certain object. The child "knows" the meaning of some "red" objects as "hot" or "not to be touched," because seeing the red object creates a motor set similar to what happened when the object was touched or when he was told not to touch. We know that a dog "knows" the meaning of meat because of his reaction to it. With human beings the word is a substitute for these reactions, a record of them, involving actual incipient movements. We can tell when a speaker is in earnest, when he *means* what he says, because we notice by his actions, his facial expression, that he "lives" every word he utters. A word, in brief, is a record of neural-muscular occurrences aroused by a situation. The situation first becomes a sign for behavior, and the behavior is the meaning of the sign. Then the word becomes a substitute for the sign, and the meaning of the word is the behavior in incipient form. There could be no language without behavior.

Language is substitute behavior

C.—THE PSYCHOLOGICAL BASIS OF MEANING

Thus far we have considered only the nature of meaning but have said nothing as to its psychological source. This is

[1] FITE, WARNER, *Moral Philosophy*, The Dial Press, 1925, pp. 151-152.

not an easy matter, since our knowledge is anything but ample. But there are several apparent facts from which we can deduce some principles. In the first place, it is obvious that the two kinds of meanings, object-meanings and value-meanings, although occurring together, must nevertheless have different bodily seats. An object is cognition, knowledge, while a value is affection, feeling. An object has an external stimulus, while the stimulus for feeling is internal. This means that the external stimulus which arouses the cortical activity that leads to the cognition "this is a chair," also arouses activity somewhere else in the body which gives rise to the accompanying feeling, "this is a *comfortable* chair." The source of object-meanings we must evidently seek in the neural basis of sensation, while the seat of value-meanings must be the internal occurrences that give sensation its feeling-tone. In the second place, it is equally obvious that past experience is the crucial fact in meaning. Past experience is a more important factor in object-meanings than in value-meanings, but it operates in both. The child feels pleasantness and unpleasantness long before it knows anything; but later on its evaluation of things will be influenced by past events. It will get to like what it once disliked and to dislike what it once liked. By experience the now pleasant may become the later unpleasant, and *vice versa.* From these apparent facts we deduce two principles: (1) That we must seek the seat of both object- and value-meanings in some property of the nervous system that makes past experience possible, (2) that besides this property of the nervous system we must also seek a bodily occurrence that gives all experience, whether immediate or past, its feeling-tone.

Objects and values have different bodily seats

The Basis of Past Experience.—The property of the nerv-

ous system that makes possible past experience is *retention*. The beginning of all experience is an impression, the nature and significance of which we have already considered under sensation. One marked characteristic of the human nervous system is its remarkable susceptibility to external influences. It registers everything that happens in its vicinity, provided the sense organs are intact. The human nervous system is the most sensitive of all impressionable substances.

Another marked characteristic of the human nervous system, and of all nervous systems, is that every impression made on it is retained, in that it produces a permanent modification in neural organization. This modification is known as an *engram* or neurogram. An engram is a neural pattern, a cortical set, a static change in the structural organization of the brain. It is a nervous pathway for a number of integrated sensations. The more often that this pathway is used the more does it become set, which means a greater readiness to respond to future stimuli of the same kind. To put it differently, the more often a neural pattern is activated, the more easily is it reactivated. In the words of Professor Herrick: "Every pattern which has once been activated seems to be preserved, set as on a trigger, ready to be activated when some related or congruous system of subcortical activities again overflows into the cortical projection centers. . . ." An engram is not an *imprint* on the nerve tissue, but a *tendency* toward a certain configuration or pattern of a number of neurones in the presence of certain stimuli.

Retention is bodily

But retention would of itself never give rise to meaning. Retention is physiological, organic, while meaning is psychological, mental. But it is physiological retention that makes possible the psychological phenomena of *familiarity* and

recognition, and it is these phenomena that give rise to meaning.

Familiarity is a dim feeling that what is being experienced now has been experienced before, but without much confidence or assurance that we are not being deceived. We may not even know just what it is that we are familiar with; we may only have the vague feeling that *something* is familiar. Recognition is familiarity become definite. The feeling is attached to some object so that it is no longer a mere feeling but a cognition. Recognition is feeling become fact, the indefinite become definite. It is the dawn of knowledge from the darkness of familiarity. In recognition there is not only a feeling that what is present now has been present before, but also knowledge of what is present. Now it is the knowledge of *what* is present that makes definite behavior in the presence of a situation possible. The knowledge is the behavior and the behavior is the knowledge. It is clear, therefore, that the engram, which is the bodily basis of recognition, is also the bodily basis of meaning. The engram, when fully established as a result of repeated impression, creates a readiness for a particular response whenever the situation, or any part of it, presents itself. The situation thus becomes a sign for the response. And since we found that meaning, whether explicit or implicit, is the behavior that a situation arouses, we may consider the engram as its bodily basis. Meaning, from the standpoint of the nervous system, is the psychological aspect of the organic engram.

Recognition is mental

The Basis of Value-meanings.—"This is a comfortable chair" is a statement of value. A value is an estimate placed upon a fact. The source of the estimate is the feeling-tone of sensation. Just as a fact is a coördination of sensations, so a

value is the sum total of the feeling-tones of the sensations. The organic basis of value must therefore be sought in the seat of feeling-tone of sensation. This we shall study in the chapter on feeling and emotion. For our present purpose it is sufficient to consider the psychological basis of value apart from its organic cause.

Value is motor

The psychological basis of value lies in the fact with which we started our study of human nature, namely, that life is conditioned on adjustment, and adjustment is always to something in the environment. The organism is driven to react to its environment in order to live. This means that it has an interest in objects, desires them, tends toward them, feels about them, selects them. It tends toward some of them more than toward others—it finds some better than others —and it tends away from some of them more than from others. The objects it tends toward are good; those it tends away from are bad. Value is thus an affective-motor phenomenon. What is strictly meant by affective-motor we shall see in detail when we come to feeling and emotion. Here it is sufficient for us to recall the fundamental fact that adjustment means an urge or drive either toward or away from different objects of the environment, and from this there arises the realm of value.

A value is a fact colored by feeling-tone to a degree such that it becomes a recognizable factor in the attitude assumed toward the situation. From the reciprocal attitudes of cat and dog when together, we judge that there is no brotherly love between them. From the glances of two persons we can tell how they value each other. A person need not say directly how he values someone; we can infer it from his words, even when his words actually belie his true feelings.

Value is thus an affective-motor phenomenon, as fact is a cognitive-cortical manifestation. Theoretically there could be fact without value, cognition without affection. But in such cases there would be no action. Actually, when a cognition is not accompanied by a certain amount of affection it does not result in overt behavior because it has no value. But facts are conditions for values, not only in that a value is a feeling-attitude toward a fact, but also in that fact-meanings can be deliberately made to generate value-meanings. To put it differently, when cognition occurs without recognizable affection, the cognition can be so treated as to give rise to affection. When the student says that he knows what the subject is about but has no interest in it—that he has cognition but no affection—the truth of the matter is that his knowledge is so vague that no feeling for it is aroused. What he has is not knowledge, perception, but something that approaches sensation. Clearer cognition would bring about recognizable affection, and the recognizable affection would, in turn, lead to clearer cognition. The greater the knowledge the greater the interest, and the greater the interest the more intense is the desire to gain more knowledge. Cognition and affection feed each other.

Value is a fact suffused with feeling

We have, then, two types of values, immediate and derived. An immediate value is one that does not depend upon the activity of valuing. We say at times that we like or dislike a person "instinctively" or "intuitively," by which term we indicate that our feeling is direct, spontaneous, immediate, non-rational. We just dislike without any reason or reasons. Or we may manufacture reasons that really have nothing to do with the case. Such immediate likes or dislikes are typical of children. The "reason" for the feeling is the feeling-tone of

Values are either immediate or derived

the sensations. A derived value is the result of the activity of valuing. It is the result of a process of deliberation. It is rational in that we can give the reasons for our attitude. I examine a proposal made to me, I weigh the pros and cons, its advantages and disadvantages, and I conclude that I like it.

Immediate values are mostly sporadic, transitory, flighty. They come and go, varying with mood and organic state. A person I dislike "instinctively" I may get to like on better acquaintance, and *vice versa.* There are, however, immediate values, such as beauty, which we shall study later on, which are the most permanent of experiences. Derived values are as a whole more lasting and less liable to change with time. They rest on a firmer foundation than immediate values and are less subject to fluctuation.

d.—SUMMARY

To summarize the discussion on the nature of interpretation, we find it to be a process of giving meaning to sensation in terms of past experience which has the characteristic of recurrence. Interpretation is the mental process through which the "anything" of sensation becomes a definite "something." Meanings are of two kinds, facts and values. Facts are objective realities, judgments of existence; values are subjective realities, judgments of attitudes. Facts are impersonal, values are purely personal. All normally constituted persons agree that "this object is a chair." But these same persons will not agree that "this chair is comfortable." Every fact bears a value to someone, and every value derives from a fact. "Iron expands when heated" is a judgment of objective reality. The expanding of the iron depends on no one's perception

Facts are external, values are internal

of the phenomenon, nor upon any one's likes or dislikes; it just happens. But "gold is more precious than iron" is a judgment of subjective reality. The statement is an expression of an attitude, of a significance attributed to objective reality, and the significance has no existence outside the person. A value is a feeling response, a fact is a cognitive response. The basis of the value is a drive, an urge, an organic process. The seat of the fact is the brain, a neural process. Facts are knowledge, values are behavior. If facts did not give rise to values there would be no action. When knowledge does not result in action in accordance with it, it is an indication that it did not attain to the status of a real value. "We must represent value to ourselves," says one writer, "as an illumination of things under the ray projected by our desires." From the standpoint of the nervous system, we may define a fact as an acquired coördination of sensations externally initiated, and a value as an acquired coördination of the feeling-tone of sensations internally generated by internal drives.

II

PERCEPTS IN OPERATION

We now turn to a consideration of some practical aspects of percepts, how they operate in daily experience, and the underlying psychology of their operations.

The most noticeable fact about the functioning of percepts in daily affairs is the variety and clash of meanings that different persons assign to the same situation. We call this fact individual differences in perception, and we want to consider the sources of these differences and some practical consequences to which they give rise.

a.—WHY WE AGREE TO DISAGREE

Opinion is neither ignorance nor knowledge

The Platonic Socrates had the disconcerting habit of drawing people into a conversation on some topic of general interest, such as justice, virtue, love, beauty, and then destroying in a gentle but devastating manner the various points of view by demanding a definition of terms. The definitions showed that the differences in opinion were due to the different standpoints, and while each individual was right from his standpoint, the standpoint itself was questionable. To Plato, opinion is the every-man's land between ignorance and knowledge. Opinion is neither ignorance, nor knowledge, but a mixture of the two. Mixtures may be of various types, from the entirely pure to the completely adulterated. Hence, there is no room for differences of point of view where there is either complete knowledge or complete ignorance. Such differences can exist only in the realm of opinion.

Try a little Platonic experiment of your own. Open a discussion among several persons on religion, or art, or morals, or progress. To begin with, you will get a variety of responses. Each person will argue the soundness of his own point of view by insisting heatedly that all others are wrong. When the riot has subsided, ask tactfully that each person state the grounds for his particular belief and forget how misguided the others are. The vehemence of the discussion will subside considerably. You will get several incoherent, vague answers, such as "Why, anybody with a grain of common sense ought to be able to, . . . etc." If you care to earn the reputation of being queer, suggest that it would be interesting to have a definition of the term under dispute. If you do this, you will find that the discussion that opened with

a double forte will close with a triple pianissimo. Now turn to some scientific topic—the electron theory, for instance. Your company will suddenly become very modest and humble, and confess to near or complete ignorance on the matter. If there is a scientist in the group, all will turn to him and accept without question what he has to say. There will be no arguments, but only requests for information. The scientist will talk impersonally, and the hearers will listen dispassionately. The scientist is accepted as an authority on the subject, and it is the electron theory that is talked about, and not personal reactions to it.

Here we have a neat problem in the psychology of perception. Human beings not only agree to disagree, but fight about their disagreements, thereby causing bitterness, strife, confusion, and persecution. This holds not only for individuals, but also for groups, nations and races. To what are these disagreements due? Are they normal? And if the disagreements are normal, why do we fight about them? Disagreements are natural, but fighting about them is unnatural and stupid. Belligerent conduct cannot help but retard progress. Scientists disagree, but instead of fighting they discuss the difficulty. They do not abuse each other, or take the disagreements personally, but proceed to investigate the problem in mutual friendship. Why does this desirable condition prevail in one realm but not in others? Let us study the matter by taking a specific illustration from the field of music.

It is a common observation that music, its meaning, and the experiences derived from it, vary to a marked degree in relation to every individual. Several years ago a country-wide investigation was conducted in an attempt to obtain some definite data concerning the extent of this variation. In this

investigation some 20,000 persons of different ages, education, environment and occupations, recorded in writing the effects produced upon them by 300 musical selections ranging from the severest classical compositions to the jazziest jazz. A study of the returns showed that although one selection produced a somewhat similar effect upon a large number of hearers, the judgments as to its meaning and value varied to a significant degree from individual to individual. Pages might be filled with quotations from the best and most cultivated minds exemplifying two extreme attitudes toward music and the gradations between them, from Dr. Johnson, to whom music was the "costliest of rackets," to Carlyle, to whom it represented "a kind of inarticulate, unfathomable speech which leads us to the edge of the infinite, and lets us for moments gaze into that." To Romain Rolland, music is a "moony light to eyes wearied of the harsh brilliance of this world's sun," while Charles Lamb sat through opera and oratorio, "till, for sheer pain, and inexplicable anguish, I have rushed out into the noisiest places of the crowded streets, to solace myself with sounds, which I was not obliged to follow, and get rid of the distracting torment of endless fruitless, barren attention." Mark Twain said that he always applauded music he did not understand because then he knew that it must be classical; and someone defined a fugue as a composition in which one theme after another comes in and one listener after another goes out.

Differences of opinion are normal

The following letter which appeared some time ago in a newspaper shows the attitude of many persons toward music in general:

Sir:—I want to make to you a confession of great aspiration and profound sorrow. Perhaps your musical critic can help me

or perhaps some of your readers among the cultured "upper ten" will be so kind as to give me a word of advice or throw upon me a ray of hope, I want to be cultured and can't. This is the story in a nutshell.

Last night I took my wife to the Mahler Symphony, or perhaps, in the interest of exact accuracy, I should say that she took me. I approached it with reverence and with a heroic determination to enjoy it because it comes *recommended* as one of the world's most notable musical masterpieces. I did not once fall asleep. I occupied five dollars' worth of seats among our best people, where I could see everything and hear everything. I did not yawn or gawk about or in any way divert my attention from the business in hand. I did not sneer or assume a superior manner, I did not feel superior to Mr. Mahler. Indeed, I feel quite crushed, and that is why I am writing to you.

I had always believed that nature intended me to be musical. When the First Regiment Band goes by I run to the window of my office and feel a real thrill. I know when the soprano in our church choir flats. I can tell a mutt from a genuine vocalist or a barroom fiddler from a Thaddeus Rich. I like to sing myself and I play four pieces on the piano.

Of course, the wonderful volume of sound produced at the symphony impressed me, and I could readily perceive that the performance was a triumph of training and control for Mr. Stokowski. But beyond that, the masterpiece meant absolutely nothing to me. Though I listened attentively and have a good ear for ordinary music, I could not *carry away with me a refrain or a bar.*

It seemed to me that all the soloists sang the same thing. Every special part, and in fact, the entire performance, was like the Gettysburg and Harrisburg Railway—began nowhere and ended nowhere. A basso with a magnificent voice rose to his feet, sang a few disconnected notes and sat down when I supposed that he was about ready to start something. Contraltos and sopranos and baritones followed him in rapid succession. The proceeding

seemed to be a sort of musical parallel to a spelling bee. They all appeared to be sung down, one after another.

In the first half there were several unexpected and entertaining "yipes" I thoroughly enjoyed, but with that exception the Mahler Symphony was as meaningless and void to me as a futurist painting.

Through all the noise I could not help thinking: "If only they could find their way out of the mess into a tune, wouldn't it be inspiring?"

But there were no tunes. Evidently classical music, to be classical, must be unmusical.

What I should like to know is this: Does a man have to degenerate to good music in the same way that he is obliged to overcome natural antipathies before he can learn to like olives or beer? Is only that in art, which is unintelligible to the average mortal, to be recognized as art? I dislike to think that it is necessary for a man to be unnatural in his tastes in order to be cultivated. It worried me when I contemplated the ecstatic faces about me. It humiliated me when Lieutenant-Governor Frank McClain turned to me and exclaimed enthusiastically after the final explosion: "That was a great second half."

Did he mean it? Has he a larger soul than I? Has he finer sensibilities, or was he merely putting up a better bluff?

What shall I do about it, Mr. Editor? Shall I continue to lie and pretend that I am crazy about classical music, as the rest of my friends appear to be? Shall I keep on in the hope that some day I will be as thoroughly "doped" as the rest of the music lovers, able to shudder at a hurdy-gurdy as the "coke" fiend shrinks from returning reason? Shall I continue my pilgrimages to the Academy shrine in anticipation of a time when I can truly like that which now displeases me and dislike that which has always pleased me? Will I be happier when that time comes—if it comes?

To this person, as to a great many others, music means a lilting tune which one might whistle or hum as a momentary recreation.

In contrast to this attitude we have that of Browning who speaks as follows through the mouth of Abt Vogler:

All through my keys that gave their sounds to a wish of my soul,
All through my soul that praised as its wish flowed visibly forth,
All through music and me! For think, had I painted the whole,
Why, there it had stood, to see, nor the process so wonder-worth:
Had I written the same, made verse-still, effect proceeds from
cause,
Ye know why the forms are fair, ye hear how the tale is told;
It is all triumphant art, but art in obedience to laws,
Painter and poet are proud in the artist-list enrolled:—

But here is the finger of God, a flash of the will that can,
Existent behind all laws that made them, and, lo, they are!
And I know not if, save in this, such gift be allowed to man,
That out of three sounds he frames, not a fourth sound, but a star.
Consider it well: each tone in our scale in itself is nought;
It is everywhere in the world—loud, soft, and all is said:
Give it to me to use! I mix it with two in my thought
And there! Ye have heard and seen: consider and bow the head!

Miss Vernon Lee, an English essayist, asked a number of persons to answer in detail the question, "When music interests you, has it got for you a meaning which seems beyond itself; or does it remain just music?"

She reports as follows:[1]

About half of the subjects interrogated did precisely answer that undoubtedly music had a meaning beyond itself, many adding that if it had not it would constitute only sensual enjoyment, and be unworthy of their consideration, some of them moreover indignantly taking in this sense my words about music remaining just music. That for these persons music did not remain just music, but became the bearer of messages, was further made cer-

[1] *North American Review*, vol. ccvii, pp. 748-757.

tain by pages and pages, often of unexpectedly explicit or eloquent writing which admitted to describe the nature of that message, to describe the things it deals with and the more or less transcendental spheres whence that message of music seemed to come.

So far for one half of the answers. The other either explicitly denied or disregarded the existence of such a message; insisted that music had not necessarily any meaning beyond itself, and far from taking the words "remains just music" as derogatory to the art or to themselves, they answered either in the self-same words or by some paraphrase, that when they cared for music it remained just music. And in the same way that the believers in music as a message often gave details about the contents of that message, so, on the other hand, the subjects denying the existence of a message frequently made it quite clear that for them the meaning of music was in the music itself, adding that when really interested in music they could think of nothing but the music.

To what are these differences in perception of music, or any other differences, due? The reader will say to differences in education, experience, and environment. And these elements are certainly significant, since percepts, as we have seen, are acquired mental attitudes, the results of experience. Considering that the sources of experience differ, or, psychologically speaking, that sensations differ in accordance with environment, the percepts formed out of the sensations will be dissimilar. These environmental differences are of tremendous extent in type and degree. In type they range from differences in home influences to national and social customs and traditions; from what and how to worship to what to eat, whom and how to marry, and how and what to do under this or that condition. In degree they vary from fixed inflexible ideas to most tolerant openmindedness. Sensations coming from such manifold sources must create a corresponding multitude of percepts.

They are due to differences in experience and temperament

But education, experience and environment do not tell the whole story. No amount of training could change the musical attitude of the letter writer quoted above to that of Browning or that of Charles Lamb to that of Romain Rolland. There is an indwelling, inner factor, namely, the bodily organization of the individual, that determines how and to what extent he is to be affected by a certain influence. Beethoven saw the world as music. To him music was life itself. To most of us, however, music is but an item, a passing phase, a temporary recreation, and it is on the music that entertains us most that we place the highest value. To an Isaiah or Jesus, God is the one reality of realities and man but an imperfect shadow of that reality; while to the vast majority God is but a word, and worship but a formality to be observed. Take God away from the Psalmist and you take life away from him. Remove God from the average man and you have simply rid him of a meaningless sound. With some people, the pursuit of knowledge is an insatiable hunger, while with others it is a burdensome task to get rid of as soon as possible. Human beings vary in their need and in their hunger for different types of experiences. Men with a great need for beauty, knowledge, God, will seek them out, pursue them, become suffused with them; while others with little need will accept beauty, knowledge, God, more or less indifferently. Some dwell in ignorance, others in opinion, and a few attain knowledge, depending upon their inherent need.

b.—TO QUARREL OR NOT TO QUARREL

What is the cause for quarrels about these natural differences in perception? The answer is simple.

Every experience is of value to him who has it. But all

All opinions have value

experiences are not of equal validity as experiences. Whenever, then, we make an attempt to impose our experiences upon other persons, or insist that our experience is as sound as is that of others, we are violating a fundamental psychological law, and trouble arises. Let us see what this means.

Two persons, A and B, partake of the same article of food; to one it tastes good, to the other it tastes bad. Both are making true statements, in that each is voicing a true experience. A dietitian examines the food and pronounces it good. Which is right, A, B, or the dietitian? Obviously all three. A and B, however, are talking not about the food itself, but about the effect it produces upon them, while the dietitian is judging the food itself. The basis of the dietitian's judgment is the nourishing value of the food, which constitutes its function irrespective of its taste, while A and B refer only to its taste. The judgments of A and B are based upon individual standards, that of the dietitian upon a general standard. In terms of the general standard food is good or bad regardless of taste. We imply these two standards whenever we say, "I know this is bad for me but I like it." It is true that what is nourishing to one may be poison to another. But the fact remains that if food is nourishing it is good, if not, it is bad, irrespective of any one person's reaction to it. If we find a person who habitually consumes impure foods, it would be absurd to attempt to demonstrate to him that the food does not really taste good to him, and to abuse or persecute him if he persists in liking it. But we would be entirely justified in concluding that his taste is on a low level, as judged by the general standard for food. While it is true, then, that there is no disputing of tastes, it is likewise true that of tastes there is evaluating. This is all very obvious in

matters of food, and here we do not quarrel, in spite of differences. If a man were told by a physician that his dietary habits were poor he would accept the pronouncement without any resentment and with no reflection upon his integrity.

But supposing that a number of persons express themselves on some matter of knowledge, say the significance of heredity in human affairs. There will be differences of opinion. If it is suggested to one or another of the disputants that his knowledge of the subject is somewhat deficient, the remark will be taken as an insult. Furthermore, each contender will be quite certain of his own infallibility, and just as certain of the fallibility of all those who differ from him. But heredity is a definite, specific thing. It either does or does not function. If it functions it does so to a certain extent and in a certain way. If there are differences of opinion as to its importance, the meaning of these differences is simply that we do not really know what it is. If we really knew what it was there could be no room for any dispute. Consequently, in the clash of opinion the participants are not discussing heredity, but themselves. Certainly heredity cannot be everything it is said to be by anyone. There is then a general standard for heredity, or for any other scientific idea, in terms of the nature of the idea itself. And if we could ascertain what the truth actually was we would have an impersonal basis for establishing the relative values of any number of variations in personal opinion; and while the opinion held by each person would be true for the person holding it, its validity as knowledge could be estimated by a standard of fact that is independent of individual attitude.

But all opinions are not of equal validity

But even in matters of factual knowledge most of us are

sufficiently modest to admit, or at least to suspect, that our information may not be altogether flawless. Let it be merely suggested, however, that there may be a general standard for art or morality or religion, besides our own individual standard, and that our individual standard may fall short of the general standard, and there will follow a deluge of protest and ridicule, if not actual abuse. The bitterness or animosity often found among art critics, and the suspicion among groups as to a standard of moral conduct, are all but general manifestations of even sharper distinctions existing among individuals. Thus one art critic comments as follows on the attempt of æstheticians to find a general standard for beauty:

> From Aristotle and Plotinus to Tolstoy and Croce, innumerable theories of the beautiful have been propounded. It has been the dream of every philosopher of art to invent a perfect system of æsthetics, that is to say, to define the beautiful in absolute terms, and to throw out of court all theories at variance with his own. I need hardly mention the manifest impossibility of such an undertaking. Any man who attempts to restrict art to a single hypothesis, whether psychological, social or moral, is an intellectual bigot or an ignoramus. I will go further: any man who declares that he has distilled the essence of the beautiful and formulated a method whereby a work of art may be infallibly analyzed, its appeal explained and catalogued, and its æsthetic value appraised and tested, is a self-deceived braggart or a fraud.[1]

We shall discuss the nature of beauty and religion in later sections. For the present, we are concerned with demonstrating the confusion in thought resulting from the failure to recognize the existence of general truths above and beyond

[1] CRAVEN, THOMAS, "Have Painters Minds?" *The American Mercury*, March, 1927, pp. 257-262.

individual inclinations. As an instance, let us consider beauty in music.

That there is such a thing as an experience of beauty, an experience such as goodness or usefulness, all will agree. There will also be agreement that what arouses beauty in one person may not, and often does not, do so in another. These facts are obvious. What is not obvious is the very important fact that even something called beautiful by a number of persons may not necessarily arouse, in all of them, exactly the same experience. To one person a particular musical selection is beautiful because it has a lilting tune easily remembered, to another because it arouses pleasant memories, another it sends off into a revery, another is interested in its style or structure, and for another it paints pleasant pictures. What each person is judging, in using the word "beauty," is not the object, but what the object means to him, his opinion of it; and what it means to him does not depend on the object alone, but on his "taste" for it. Music, however, has an inherent nature of its own which is independent of any one person's "taste" for it, just as a scientific fact is a fact, no matter what the opinions about it may be. "The task of clearly realizing music as a self-subsistent form of the beautiful," writes Hanslick,[1] "has hitherto presented unsurmountable difficulties to musical æsthetics, and the dictates of 'emotion' still haunt their domain in broad daylight. Beauty in music is still as much as ever viewed only in connection with its subjective impressions; and books, critiques, and conversations continually remind us that the *emotions* are the only æsthetic foundation of music, and that they alone are warranted in defining its scope." This indi-

There is a standard other than personal experience

[1] *The Beautiful in Music,* Novello, Ewer, 1891, p. 17.

vidualistic standard for the significance of music Hanslick holds to be false. "If the contemplation of something beautiful arouses pleasurable feelings, this effect is distinct from the beautiful as such. I may, indeed, place a beautiful object before an observer, with the avowed purpose of giving him pleasure, but this purpose in no way affects the beauty of the object. The beautiful is and remains beautiful though it arouse no emotion whatever, and though there be no one to look at it. In other words, although the beautiful exists for the gratification of an observer, it is *independent* of him."[1] If the beauty of music—or for that matter, of any art—depended upon individual emotion, then beauty would be anything and everything that anyone calls beauty, and hence, nothing. There must be a standard for beauty, as there is a standard for truth, which arises out of the nature of the thing itself, and is independent of all individual reactions. If a scientific fact were only a matter of individual opinion, there would be no science. But in science we do differentiate between what is actually fact and what is considered by some person or persons to be fact. The teacher examines the answers given by students to a question of fact, and evaluates each in terms of the fact itself. If he did not have this general standard, one answer would be as true as another; there would be only opinion and no truth. There are likewise æsthetic facts, religious facts, ethical and moral facts, which, although they present individual variations in attitude, at the same time possess traits and characteristics that constitute their essence and without which each would not be what it really is. The existence of these facts does not depend upon their being experienced by anyone. "Nothing knowable is

[1] *The Beautiful in Music,* Novello, Ewer, 1891, pp. 18-19.

dependent for its existence upon its being known." A person's opinion of what a thing is may be the exact opposite of its actual properties. Each opinion includes some element that is absent from the fact of which it is an opinion. An opinion is a truth darkly seen; some opinions are close to black ignorance, others approach luminous truth. All differences of opinion are so many variations of one theme of truth, and while every opinion contains something of the truth, it is, nevertheless, not the truth itself. What each person perceives to be beautiful in a work of art, or sacred in religion, or moral in conduct, is but an individual reflection of what art and religion and morality are in themselves, and these reflections may vary from representations of the thing as it really is to representations of the thing as it really is not.

The standard is the genius who knows

Music cannot be both a means toward an end, as claimed by one group of Vernon Lee's correspondents, and an end in itself, as claimed by the other group. It is either one or the other. Both cannot be right, although both may be wrong. To decide which is which, we must ask what music is as music, without reference to what it means to anyone. The temperature of a room will affect people differently, and if we want to know what the temperature is we will not ask the individuals but consult the thermometer. What the individuals feel is caused by the temperature, but is no measure of it. The temperature is specific; its effects, many and various. The fact that some people insist that the temperature is low because they are cold, and others insist that it is high because they are warm, in no way affects the temperature. The mercury cannot be simultaneously high and low.

In a passage in *The Republic*, Plato discusses in so illuminating a manner the relationship between the real nature

of a thing itself, and its reflected nature as experienced by individuals, that it is worth quoting at some length:

> And whom, he asked, do you call genuine philosophers?
>
> Those who love to see truth, I answered.
>
> In that, he said, you cannot be wrong: but will you explain what you mean?
>
> That would be not at all easy, with a different questioner: but you, I imagine, will make me the admission I require.
>
> What is it?
>
> That since beauty is the opposite of deformity, they are two things.
>
> Of course they are.
>
> Then since they are two, each of them taken separately is one thing.
>
> That also is true.
>
> The same thing may be said likewise of justice and injustice, good and evil, and all general conceptions. Each of them in itself is one thing, but by the intermixture with actions and bodies and with one another, through which they are everywhere made visible, each appears to be many things.
>
> You are right.
>
> By the help of this principle, then, I draw a distinction between those whom you described just now as lovers of sights, lovers of arts, and practical persons, on the one hand, and on the other, those about whom we are now inquiring, to whom alone we can rightly give the name of philosophers.
>
> Explain what you mean.
>
> Why, I suppose that those who love seeing and hearing admire beautiful sounds, and colours, and forms, and all artistic products into which these enter; but the nature of beauty in itself their understanding is unable to behold and embrace.
>
> Yes, it certainly is as you say.
>
> But those who are capable of reaching to the independent contemplation of abstract beauty will be rare exceptions, will they not?
>
> They will indeed.

Therefore if a man recognizes the existence of beautiful things, but disbelieves in abstract beauty, and has not the power to follow should another lead the way to the knowledge of it, is his life, think you, a dreaming or a waking one? Just consider. Is it not dreaming when a person, whether asleep or awake, mistakes the likeness of anything for the real thing of which it is a likeness?

I confess I should say that a person in that predicament was dreaming.

Take again the opposite case, of one who acknowledges an abstract beauty, and has the power to discern both this essence and the objects into which it enters, and who never mistakes such objects for the essence nor the essence for the objects; does such a person, think you, live a dreaming or a waking life?

A waking life undoubtedly.

If so, shall we not be right in calling the mental process of the latter knowledge, because he really knows; and that of the former, opinion, because he merely opines? . . . These positions then being laid down, I shall proceed to interrogate that worthy man who denies the existence of anything absolutely beautiful, or any form of abstract beauty, which for ever continues the same and unchangeable, though he acknowledges a variety of beautiful objects,—that lover of sights, who cannot endure to be told that beauty is one, and justice one, and so on of the rest:—My good sir, I shall say, of all these beautiful things, is there one which may not appear ugly? Of all these just things, is there one which may not appear unjust? Or of these holy things, one which may not appear unholy?

No, answered Glaucon: they must inevitably appear in a certain sense both fair and foul, both just and unjust, both holy and unholy.

Again, may not the many double things be considered halves just as well as doubles?

Just as well.

In the same way, have the things which we describe as great, small, light, heavy, any better claim to these titles, than to their opposites?

No, they will always be equally entitled to either.

Would it be more correct, then, to predicate of those many objects that each of them is, or is not, that which it is said to be?

You remind me of the conundrums with a contradiction in them, that are proposed at table, and of the children's riddle about the eunuch who threw at the bat, hinting darkly with what he hit it, and on what it sat: for the things in question have the same ambiguous character, and one cannot positively conceive of them as either being or not being, as both being and not being, or as neither.

Can you tell, then, said I, what to do with them, or where they may be better put than in the interspace between being and not being? For I presume they will not appear either darker than the non-existent, and so more non-existent, or more luminous than the existent, and therefore more existent.

You are perfectly right.

Hence we have discovered, apparently, that the mass of notions, current among the mass of men, about beauty, justice and the rest, roam about between the confines of pure existence and pure non-existence.

We have.

And we before admitted, that if anything of this kind should be brought to light, it ought to be described as the object of opinion, and not of knowledge,—these intermediate rovers being caught by the intermediate faculty.

We did make this admission.

Therefore, when people have an eye for a multitude of beautiful objects, but can neither see beauty in itself, nor follow those who would lead them to it,—when they behold a number of just things, but not justice in itself, and so in every instance, we shall say they have in every case an opinion, but no real knowledge of the things about which they opine.

It is a necessary inference.

But what, on the other hand, must we say of those who contemplate things as they are in themselves, and as they exist ever

permanent and immutable? Shall we not speak of them as knowing, not opining?

That also is a necessary inference.

Then shall we not assert that such persons admire and love the objects of knowledge,—the others, the objects of opinion? For we have not forgotten, have we, that we spoke of these latter as loving and looking upon beautiful sounds and colours and the like, while they will not hear of the existence of an abstract beauty?

We have not forgotten it.

Shall we commit any fault then, if we call these people philodoxical rather than philosophical, that is to say, lovers of opinion rather than lovers of wisdom? And will they be very much offended with us for telling them so?

No, not if they will take my advice: for it is wrong to be offended with the truth.

Those therefore that set their affections on that which in each case really exists, we must call not philodoxical, but philosophical?

Yes, by all means.[1]

But where is this general standard to be sought? Plato answers the question: In those who stand at the peak of vital human interests, and to whom knowledge, beauty, religion, morality, are not merely intellectual games, but life itself. When we want to know what science is we do not ask ourselves but we inquire of Copernicus, Kepler, Galileo, Newton, Einstein, and we listen to them with admiration, respect, and humility. If we would know what beauty is, we must go to the outstanding geniuses in the realm of art, those to whom beauty is the breath of life, to whom beauty is truth, and truth, beauty. And so with religion. Eliminate God from the life of an Isaiah, a Jeremiah, a Plotinus, a Jesus, and nothing

[1] *The Republic of Plato,* Davies & Vaughan, Macmillan and Co., 1868, pp. 189-196; reprinted by permission.

but a cold skeleton remains. To them God is a rock and a foundation and religion not a debate, but life. To study these spiritual giants is to attain to an understanding of the significance of religion in its universal nature. They represent the gigantic One, the perfect and pure, of which we are the lesser many, the imperfect, the impure. But while most of us accept authority in science and are humble when we come to something beyond our grasp, in philosophy, art, religion and morality, authority in the sense of a non-personal standard is anathema to us. Hence our abnormal quarrels about perfectly normal differences in percept.

We quarrel for various reasons

We quarrel, first, because of our stubborn refusal to recognize the existence of a non-personal standard in matters of real, vital concern, particularly when that standard is beyond our mental grasp. We quarrel, second, because of our obstinate refusal to admit even the possibility that our personal need or standard may be below the general standard or that the standard of another may be above that of our own. We quarrel, third, because of our sometimes mild, but often militant, insistence, that our standard is the only standard which must be accepted by others if they are to be saved. We quarrel, fourth, because of a false education which often sets up a general standard to the disregard of individual needs, and implants the mischievous idea that there is a stigma attached to those who fail to reach the top.

To illustrate these four points, let us now turn to an examination of our letter writer who wished to be cultivated and could not. What is his psychology?

1. He hears that the Mahler Symphony is great music.
2. He feels that he is musical, and would resent any

implication that he is not as musical as some other person.

3. Since he is musical he should readily grasp any music that music critics consider good. If he does not grasp it there must be something wrong with the music.

4. The fact that others seem to enjoy the music produces a feeling of inferiority, which is compensated for by a suspicion that his neighbors are pretending.

5. He writes the letter in a spirit of resentment that his own particular musical needs, an easy tune to whistle, should not be the general musical standard for everyone else as well.

If this man had read a book on science which was beyond his comprehension, his feeling about the matter would be very different. He would be willing to admit that his inability to understand it was not necessarily a reflection on the soundness of the book, nor would he suspect the integrity of someone who claimed to grasp its meaning. But his inability to understand the music is a reflection on the music as well as on those who do seem to find something significant in it. In art, whatever or whoever is not with him is against him.

In a passage in the reminiscences of Mark Twain there is a capital example of the fourth cause. He writes:

Huge crowd out tonight to hear the band play the 'Fremersburg!' I suppose it is very low-grade music—I know it must be low-grade—because it so delighted me, it so warmed me, moved me, stirred me, uplifted me, enraptured me, that at times I could have cried, and at other times split my throat with shouting. The great crowd was another evidence that it was low-grade music, for only the few are educated up to a point where high-class music gives pleasure. I have never heard enough classic music to

be able to enjoy it, and the simple truth is I detest it. Not mildly, but with all my heart. What a poor lot we human beings are anyway! If base music gives me wings, why should I want any other? But I do. I want to like the higher music because the higher and better like it.[1]

Surely, if base music gives him wings, why should he want any other? If the music gives him wings, it cannot possibly be base music. The poisonous thought had been implanted in his mind by some superior person, that music which stirred, uplifted, enraptured him, was low music, and that it had no business to do these things to him or that he had no business to permit it to have such effects on him. So he wants to like what the higher like, although he heartily detests it. In his case an external, artificial standard played havoc with a pure palate, causing him to feel inferior. Such a feeling of inferiority is apt to make persons, who are not so thoroughly honest with themselves as Mark Twain, pretend to like what bores them in order to produce the right social effect upon their friends. They are ashamed to confess their own honest tastes. This pretending and fourflushing are the direct result of a false education which disregards individual differences, assumes that one can lift oneself by one's bootstraps, concocts an artificial standard, and insists that all who fail to accept this standard are forever damned. Art, religion and morality are honeycombed with this mischief-provoking doctrine.

In sum, variations in perception are normal and natural because of differences in environment, and particularly because of differences in constitutional make-up. A law of nature is difference in likeness and likeness in difference. Hence it is true that of tastes there is no disputing. Disputes arise

[1] HOLMES, RALPH, "Mark Twain and Music," *Century*, Oct., 1922.

because of a failure to realize the fact that although one taste is as good for one person as another is for another person, some tastes approach closer to the nature of the thing of which they are tastes than do others. It should be possible, therefore, for a person to realize that his taste is below the general standard, but that that is no reflection upon him since his need does not exceed his satisfaction. One need is as legitimate and natural as another. It is as right for one person to enjoy "The Storm at Sea" as it is for another to thrill to Beethoven's Ninth Symphony, even though the Beethoven symphony and "The Storm at Sea" are not of equal musical quality. Each meets a need, and is therefore equally valuable. One is transitory, passing, ephemeral; the other is permanent. An opinion passes away; a truth remains forever. Codes, dogmas, and creeds in art, religion, and morality arise and disappear, but art, religion and morality remain. Once this fact of the relationship between the individual estimate and the universal truth has become inculcated in the minds of human beings, individual differences will remain, but disputes and ill feeling will disappear.

To dispute is foolish, but to evaluate is wholesome

C.—THE SOURCES OF PERCEPTS

The stock of our ideas with which we carry on our mental business is obtained from two sources. Although these sources are supplementary rather than exclusive, they are nevertheless sufficiently distinct for differentiation and classification.

The origin of one group of ideas we can readily trace to our direct education. They constitute the principal stock-in-trade which we exhibit in our mental show window to attract social attention. We acquire these ideas in school courses, and they represent our mental adjustment to the sum total

Some percepts we obtain directly

of systematized knowledge of the ages. In school we "take" these courses more or less reluctantly, while out of school they are served to us in the sugar-coated forms of outlines of histories, literatures, arts, stories of civilization, philosophies, A, B, Cs of science, and in tabloid form as "notebooks" and correspondence courses guaranteed to make us social lions and industrial bears with little effort and less time. With the exception of the professional man and the specialist, to whom they represent an economic asset, these directly acquired ideas sit lightly on the mind of the vast majority of men and women. The college man who not only "took" certain courses but whom they also "got" is a rare specimen, to be exhibited as a curiosity, as an intellectual mutation. We seldom quarrel about such ideas; in fact, we use them, from time to time, as mental plumage. Their effect on the thought life of the individual is as insignificant as is that of muscular skills on general behavior.

Besides these surface ideas, small in number and trite in influence, there is a mass of percepts broad in range and deep in effect, which was imbibed indirectly and unconsciously from the soil and atmosphere in which the individual was reared and which became woven into the very fabric of his mental existence. Long before directly presented ideas can even begin to be received, the others have already bent the mental twig and determined the direction of its growth. Indirect mental influences do their most effective work during the early years of life; and in comparison with their power for shaping the mental future of the individual, those acquired by direct education are of little significance. In fact, indirectly acquired ideas prepare the soil for the reception of those presented directly. A child reared in an atmosphere

Others we come by indirectly

of broad culture, intellectual tolerance and honesty, will profit by later direct education to an extent far beyond that of another child with equal mental powers who has been cradled in a more restricted mental environment.

A characteristic which distinguishes direct from indirect percepts is the apparent reasonableness of the former and the unreasonableness of the latter. One can usually state the grounds in support of a direct percept, while the grounds of indirect percepts, even when presented, seem vague and unconvincing. This fact is often interpreted to mean that direct percepts are logical, based upon reason, and therefore sound, while indirect percepts are illogical, have nothing but "intuition" for their basis, and are therefore unsound. This distinction is superficial. In fact, what we usually call intuitive judgments are as a whole more logical, in the sense that they are truer, because they are more vital. The man with a keen sympathetic interest in human beings, driven by this interest to seek contacts with all sorts and conditions of human affairs, may be trusted to be a better judge of character than the professional psychologist who has a head full of facts but little understanding. The human being dealt with in the psychology textbook whose traits are neatly catalogued with a logical consistency, is an abstraction, a figment, a fiction, a skeleton. To become a living, functioning entity, this skeleton of logic must be clothed with the flesh and blood of understanding. Intuitions, which are judgments of insight resulting from interest, give rise to sympathetic understanding. There are grounds for an intuitive percept, but they are so very subtle, or they have been gathered from such wide and varied sources, or they constitute so much a part of the

There are reasons both for direct and indirect percepts

individual, that it is difficult to make them articulate. There are very good and real reasons for Romeo's adoration of Juliet, but they are apparent neither to him nor to anyone else. Should he attempt to give logical reasons, he and his beloved would become ridiculous. If someone should demonstrate Juliet's faults to him he might admit the accusation to be true, but the demonstration would produce no change in his attitude. He is not illogical; he is superlogical. He has reasons better than those which he can present glibly. There are reasons, and very basic ones, why we dislike some persons and like others. If we attempt to explain our attitude we of course enumerate some traits possessed by the individuals. But, at the same time, we know that we dislike some persons even while admitting their good qualities, and that we like others in spite of their outstanding faults. There are sound reasons why certain articles of food taste good. But it would take a chemical analysis of the foods and of our physiological constitutions to find them. Our inability to give the reasons, however, does not invalidate our tastes.

There are very good reasons why we thrill to some musical selections or a bit of natural scenery, and we would ridicule anyone who insisted that we have no business to do so because we cannot justify our experience on logical grounds. Many attempts are made and have been made by critics to demonstrate the beauty of a work of art. But these neat logical structures have never enabled anyone to see the beauty when he has not first experienced it directly and immediately.

But God has a few of us whom he whispers in the ear:
The rest may reason and welcome; 'tis we musicians know.

"Critics always wish to know what the composer himself cannot tell them," complains Schumann, "and critics sometimes hardly understand the tenth part of what they talk about. Good heavens, will the day ever come when people will cease to ask us what we mean by our divine compositions? Pick out the fifths, but leave us in peace." The philosophers and theologians have deduced ample reasons for the existence of God. But when we want God we go to those to whom He is a reality and not a reason.

The reader must not draw the conclusion from this discussion that logical and intuitive percepts are contradictory. No mental processes can be contradictory if they are sound. A maxim like "The heart has its reasons of which the mind knows naught," is a dangerous misconception. What the relationship between the two is, will be discussed later in the section on reasoning and imagination.

III

TYPES OF PERCEPTS

We have seen that the perceptual processes of differentiation, interpretation and evaluation give rise to percepts of fact and percepts of value. We shall now discuss briefly the several kinds of particular percepts which belong under this general classification.

a.—PERCEPTS OF FACT

A fact is an impersonal truth. It is a judgment of the nature of a phenomenon, arrived at by a certain method of procedure, the main characteristic of which is its freedom from personal preferences and inclinations. Factual percepts

are either scientific or philosophical. Scientific and philosophical percepts refer to the impersonal nature of occurrences. Their meaning is "This is true," or, "This is false."

Science describes

Science is interested in obtaining percepts regarding the structure or the elements of phenomena. Its method is therefore that of analysis. By this method it seeks answers to the questions: What is it that is happening? When and under what conditions does it happen? How does it happen? Its ideal is to answer these questions as precisely as possible, as simply as possible, as completely as possible, and as consistently as possible. For percepts to be scientific, they must be obtained by observation and experiment; they must be presented systematically and be subjected to verification. Scientific percepts are descriptions of happenings, and not explanations. Science describes a sequence of events, but it can give no explanation for the sequence. It tells what, when and how, but not why. It deduces hypotheses or theories from its observation and experiments, but its hypotheses are not explanations of occurrences, but a systematization of them. The chief value of such a hypothesis as the electron theory of matter lies, in the words of a prominent scientist, "not in its objective truth, but in its success in accounting for, in coördinating, what we actually observe, and in predicting results which are afterward verified." The ideal aim of science is not to explain, but to describe, in order to be able to control by predicting what will happen under certain conditions, and when and how.

Philosophy begins where science leaves off. Its aim is either to examine the hypotheses of science or to coördinate the separate facts of science into a rational whole in order to present a synthetic view of the world. Philosophy is therefore

more interested in explanation than in description. It takes the results of description for its raw material and seeks their meaning. The method of philosophy is synthesis, putting together, relating; and it thus supplements science which analyzes, breaks up and takes apart. Dr. Russell gives the following example of one of the concerns of philosophy with science, namely, examining its hypotheses:

Philosophy explains

Let us take first the belief in common objects, such as tables and chairs and trees. We all feel quite sure about these in ordinary life, and yet our reasons for confidence are really very inadequate. Naïve common sense supposes that they are what they appear to be, but that is impossible, since they do not appear exactly alike to any two simultaneous observers; at least, it is impossible if the object is a single thing, the same for all observers. If we are going to admit that the object is not what we see, we can no longer feel the same assurance that there is an object; this is the first intrusion of doubt. However, we shall speedily recover from this set-back, and say that of course the object is "really" what physics says it is. Now physics says that a table or a chair is "really" an incredibly vast system of electrons and protons in rapid motion, with empty space in between. This is all very well. But the physicist, like the ordinary man, is dependent upon his senses for the existence of the physical world. If you go up to him solemnly and say, "Would you be so kind as to tell me, as a physicist, what a chair really is," you will get a learned answer. But if you say, without preamble: "Is there a chair there?" he will say: "Of course there is; can't you see it?" To this you ought to reply in the negative. You ought to say, "No, I see certain patches of colour, but I don't see any electrons or protons, and you tell me that they are what a chair consists of." He may reply: "Yes, but a large number of electrons and protons close together look like a patch of colour." What do you mean by "look like"? you will then ask. He is ready with an answer. He means that light-waves start from the electrons and protons (or, more prob-

ably, are reflected by them from a source of light), reach the eye, have a series of effects upon the rods and cones, the optic nerve, and the brain, and finally produce a sensation. But he has never seen an eye or an optic nerve or a brain, any more than he has seen a chair; he has only seen patches of colour which, he says, are what eyes "look like." That is to say, he thinks that the sensation you have when (as you think) you see a chair, has a series of causes, physical and psychological; but all of them, on his own showing, lie essentially and forever outside experience. Nevertheless, he pretends to base his science upon observation. Obviously there is here a problem for the logician, a problem belonging, not to physics, but to quite another kind of study. This is a first example of the way in which the pursuit of precision destroys certainty.

The physicist believes that he infers his electrons and protons from what he perceives. But the inference is never clearly set forth in a logical chain, and, if it were, it might not look sufficiently plausible to warrant much confidence. In actual fact, the whole development from common-sense objects to electrons and protons has been governed by certain beliefs, seldom conscious, but existing in every natural man. These beliefs are not unalterable, but they grow and develop like a tree. We start by thinking that a chair is as it appears to be, and is still there when we are not looking at it. But we find, by a little reflection, that these two beliefs are incompatible. If the chair is to persist independently of being seen by us, it must be something other than the patch of colour we see, because this is found to depend upon conditions extraneous to the chair, such as how the light falls, whether we are wearing blue spectacles, and so on. This forces the man of science to regard the "real" chair as the cause (or an indispensable part of the cause) of our sensations when we see the chair. Thus we are committed to causation as an *a priori* belief, without which we should have no reason for supposing that there is a "real" chair at all. Also, for the sake of permanence we bring in the notion of substance: the "real" chair is a substance, or collection of substances, possessed of permanence and the power to

cause sensations. This metaphysical belief has operated, more or less unconsciously, in the inference from sensations to electrons and protons. The philosopher must drag such beliefs into the light of day, and see whether they still survive. Often it will be found that they die on exposure.[1]

Of the other objective of philosophy, to present a synthetic view of the world, Professor Thomson writes:

As the scientific order transcends the empirical, it is transcended in turn by a philosophical order which aims at a harmonious interpretation of our experience as a whole. The essential change is often referred to as passing from the "how" to the "why," from analytical and historical description to interpretation; but there is also this difference, that while science must keep feeling at an arm's length, philosophy seeks to give a view of the world that will satisfy the claims of feeling as well as those of the understanding. It is just our outlook on the whole of life, the world within as well as the world without, and it includes the assets of feeling as well as intellectual gains.

To illustrate concretely: biologists are easily satisfied with their outlook on animal nature if they are willing to leave out of account the fact of human personality at its best, or the fact of human society. We may define our biology so as to exclude them —that is a question of method—but to think of leaving them out in our total interpretation of our experience is to allow the light that is in us to be darkened. Similarly, although there is great difference of opinion in regard to the philosophy of the beautiful, there is general agreement that our total outlook on Nature is to be distrusted if the fact of beauty has been ignored. Feeling is to be excluded from scientific investigation, but it must be allowed to operate in our philosophical synthesis. Perhaps we may say that feeling supplies the mortar in which are laid the stones contributed by Natural Science to the (synoptic) edifice which the genius of Philosophy is building.[2]

[1] RUSSELL, BERTRAND, *Philosophy*, W. W. Norton, 1927, pp. 3-5.
[2] THOMSON, J. ARTHUR, *op. cit.*, pp. 34-35.

b.—PERCEPTS OF VALUE

Value percepts are either ethical, moral, æsthetic or religious. The main characteristic of value percepts is their personal coloring, in contrast with the impersonality of fact percepts. A value percept is a judgment of a personal truth. The judgment is not valid except for the person or group of persons making it.

Ethical Percepts.—An ethical percept, such as *honesty, loyalty, patriotism, square dealing,* is an instrument for the maintenance of social order. It is a social utility by means of which a group of individuals assures to itself an orderly communal existence and avoids conflict and confusion. So soon as several persons begin to dwell together some laws of behavior will arise spontaneously to regulate the relationship between individual and individual. These laws are handed down from generation to generation and constitute the tradition, the social heritage, the *mores* of a group. The main feature of an ethical percept is that it places a limitation upon the scope of individual activity for the assumed welfare of the group. It is objective, impersonal, mandatory. Ethically, an act is right or wrong, irrespective of the individual that performs it. We are born into these percepts. If we follow them we meet with social approval; if we disobey them society exacts reparation. Right or wrong is fixed and permits of no individual variation. The welfare of the group is the dominant motive even at the cost of the suppression of the individual. Hence the conflict between individual and society. Society does not explicitly recognize variation of individual need, and the individual does not recognize the absolute authority of society. And yet a group is but a collec-

Ethical percepts are social utilities

Ethics is authoritative

tion of individuals. The conflict appears on the surface to be destined, a sort of necessary evil. The effect that the group produces on the individual and the interaction between individual and society constitute a problem belonging to social psychology. But what constitutes behavior that would be conducive to the welfare of both the individual and society is the problem of ethics. The student of ethics seeks to discover a law or a principle to serve as a guide for the conduct of individuals which would promote the greatest good of the greatest number. Many such principles have been proposed in religion and philosophy: the Ten Commandments and the Sermon on the Mount, Confucianism, Buddhism, Zoroastrianism, Platonism, Stoicism, Epicureanism, Utilitarianism, Egoism, Rationalism, Intuitionism, Pessimism. The most famous single ethical principle is that advocated by Kant, known as the categorical imperative. It reads as follows: "So act that you could wish your maxim to be universal law." The most recent attempt to formulate a general ethical principle has its basis in mechanistic psychology. One of the advocates of this point of view says:

> It regards the realm of ethics as coterminous with the arena of human activity, and holds that the problems of conduct, being exclusively man's problems, are to be solved by the methods of applied science. Moreover, since human conduct is in the last analysis dependent upon the postures and operation of our muscle-fabric, he who would understand ethics must first comprehend something of the mechanics of the human organism. Indeed, this book attempts to show, not only that ethics and physiology can no longer be studied apart from one another, but also that it is the structure and functions of the human body which have determined just what our ethical values are.[1]

[1] GIVLER, ROBERT G., *op. cit.*, p. 1.

An ethical percept is standardized and authoritarian. The source of the authority may be God, the state, the group, the moral law, or the moral sense. But no matter where the authority lies, the "rightness" or the "wrongness" of the act does not depend on the individual. The authority is imposed upon the individual as a duty. To perform a duty is to act in keeping with authority, and to be ethical is to conduct oneself according to one's duties. The mark of an ethical percept is that the conduct it prescribes is absolutely evil or good, right or wrong.

Ethical percepts vary from group to group, both in time and place. We therefore have race ethics, national ethics, sectional ethics, class ethics, professional ethics, sex ethics, personal ethics, social ethics, private ethics, public ethics, practical ethics, ideal ethics, campus ethics, classroom ethics, ethics for children, ethics for adults, and so on. What is ethical at one time and in a certain place becomes unethical at a later time and in another place. What is a crime in one locality or at a certain period is often a virtue in another locality or at a later period. They also vary with conditions. The physician may tell a lie, the business man may dodge the truth in order to be "tactful." Ethical percepts extend in range from the smallest social group, the family, to the largest group, the nation and even mankind. The percept, brotherly love, ranges all the way from the single family to the human family as a whole. But what is ethical in one social unit is not necessarily ethical in another unit. Many acts are ethical in the family which are unethical outside the family; and the ethics of business is not that of the physician, the lawyer, or the preacher. In each unit, different and even conflicting and contradictory ethical percepts exist to main-

There is variation in ethical percepts

tain the integrity and stability of that particular unit. What ethical percepts one and the same man follows depends on where he is at a given time. If he is in his home his ethical percepts are not those of his business office, or when he is in church, or when he is in a different locality, or when he visits France. Means vary with the ends to be achieved; and since the ends differ from group to group and from unit group to unit group, the ethical means for their attainment likewise differ.

A *crime* is a violation of a certain ethical percept, either in a certain social group or in a unit group within the social group. But conditions also alter crime. It is a crime to hold up a man at the point of a gun and take his small change. But it is no crime to corner the wheat market and obtain millions. Ethical percepts permit of double dealing. A man may subscribe to a certain ethical principle and practice just the opposite. He is branded a hypocrite, but he not only gets away with it but may even arouse envy and admiration. To insult a woman is everybody's business, but to insult one's wife is nobody's business. In one case it is a crime, in the other just an occurrence, a privilege. Although ethical percepts maintain the surface stability of a group, they create much confusion, distrust, suspicion, gossiping, and conflicts among the individuals and unit groups constituting the social organization.

Moral Percepts.—The reason for this undesirable state of affairs becomes clear when we consider the nature of moral percepts.

Ethical percepts place stress upon the end to be accomplished. Every group places its stamp of approval upon certain ends. If the end is accomplished in such a manner that

Moral percepts are individual

it does not actually interfere with some other approved end, the means for its accomplishment are accepted and the person is ethical. Thus among Western peoples, particularly in the United States, the amassing of money is an end generally approved of. If a man accumulates a fortune even by means that are somewhat unscrupulous—short of robbing banks, or hold-up jobs—he is socially accepted as ethical, and even honored. Likewise, the making and maintaining of a home is a virtue that society rates highly. Consequently, so long as a man maintains a home, the way he maintains it—whether he beats his wife or is cruel to his children—is as a whole disregarded. Furthermore, if a man gives his approval to an end socially accepted, he is considered ethical whether or not he practices his belief. Ethically one may violate a law even with impunity, provided one proclaims loudly his belief in it.

From the moral standpoint, on the other hand, ends and beliefs are secondary, while means and actions are primary. Not what one *accomplishes* outside of himself, but what he *is* in himself, is the all-important consideration. Hence, morally, an act is neither right nor wrong in itself as an act, but its rightness or wrongness arises from the person who performs it—whether it enriches or impoverishes his personality. The moral standard is not external, but internal. As Professor Fite says: "In the end each of us is standing for something than which nothing can be assumed by him to be better." [1] If an act is in keeping with that "something," it is moral.

Morality is self-centered

We may draw upon art for an illustration of what is involved in the moral percept.

[1] *Op cit.*, p. 2.

Let us consider six artists painting the same landscape. If the six paintings are merely literal copies of the natural scene, we say they are photographic and not artistic. If the paintings are very much alike we brand them as mechanical, cold, lacking in character. What we prize in a painting is individuality, or the personality of the artist as it is reflected in his work. The six painters might adhere rigidly to technical laws that had been taught to them, in which case they would produce pictures that were *correct*, that were *right*, but we would judge them to be without artistic value. Apparently, if a painting is to be not only correct, but also a work of art, the painter cannot follow rules other than those that enable him to express his own particular objective or conception. A line or a design in a painting is therefore never right or wrong in itself. If the line fits in well with the artist's objective and aids in expressing what he is after, it is right. If it does not fit in with the whole but distorts it, it is wrong. The standard for right and wrong is here not external, apart from the painting and the painter, but internal. If the painter is to be an artist and not merely a craftsman, he himself must decide the means through which his unique aim is to be expressed. Similarly, a single tone in a melody is never right or wrong in itself, but receives its significance from the entire melody of which it is a component part. The same tone may be *wrong* in one melody and entirely *right* in another. Two painters can therefore use the same line and it will be right in one case and wrong in another.

The basis of a moral judgment of an act is precisely similar to that of a line in a painting. What is valued and prized in human beings is not their likeness, but their individuality. They are alike only in being different. Each person is an

entity, a world in himself. Hence an act cannot be right or wrong in itself. Whether it is right or wrong depends on the individual who performs it. If the act is in keeping with the personality, it is right; if it is out of harmony with it, it is wrong. Two persons may then engage in the same act, and it may be right for one and wrong for the other.

Morality, it must be quite obvious, is a function of critical intelligence. A person must know himself quite well before he can judge whether an act promotes or distorts his true self. Self-knowledge is therefore the sole fundamental virtue from the moral point of view. All other virtues arise from it. We feel this principle of "know thyself" in operation whenever we reproach ourselves with having committed an act which is unworthy of us. It is unworthy because it does not fit into the picture we have formed of our true self. This is the substance of Plato's contention that self-knowledge is the only virtue and ignorance the only vice, and that no one does evil intentionally but out of ignorance. The thief is ignorant of his real self and he consequently violates it. The moral person would no more commit a wrong act, an act that would violate his self, than would a painter deliberately introduce a line into his painting that would distort it. If the painter does introduce such a line it is because he is ignorant. To be moral is to know what one is doing. And one knows what one is doing only when there is *self-knowledge*, in terms of which one discriminates and controls his activities. The ignorant man cannot be virtuous, said an ancient sage. This is the substance of a moral percept. "The kingdom of heaven is within you" is another expression of the same point of view.

We can now return to a problem raised in the chapter on

Habit, regarding the conflict between the individual and society arising out of the modification of social habits by individual needs. The problem may now be more specifically stated as follows: Since society values and honors individuality, and since there could be no individuality when the standard for conduct is arbitrary and absolute, how does it happen that there is a conflict between the individual and society, and how did the problem of authority versus freedom arise?

The answer to this question is twofold: (1) the abuse of authority and of freedom, and (2) the mistaking of means for ends.

Social conflict due to abuse of freedom and authority

In every social organization one or more groups arise which allocate to themselves dictatorial powers as to what the rest of the members of the group shall think and how they shall act. The set of "rules" evolved by the group promotes its interests, and hence the attempt is made to make these rules prevail generally and to perpetuate them. Such authority does not promote the welfare of all, but of the few. The authority is arbitrary, forced; hence it is not used, but abused. And abuse inspires revolt. It is this abuse of authority that the great reformers of the ages denounced in vehement terms; "I came not to destroy the law but to fulfill it," was uttered in denunciation of a priestly group which demanded from the multitude obedience to a code that promoted its own special interests and privileges. The protest was not against authority, but against those whose interest was not so much to enforce the moral law as to enforce an interpretation of the law that suited their purpose.

On the other hand, there is abuse of freedom. In every group there are individuals who lack critical intelligence, discrimination and control, and who mistake looseness for

freedom. They wish to follow their immediate impulses, and they resent any obstruction to what they call their "rights." But there is no freedom where there is no control and discrimination. The admonition, "When smitten on one cheek, turn the other," is not a counsel of humility and servitude, but one of courage and freedom. The immediate impulse when one is smitten on one cheek is to smite the offender on both cheeks. To follow the impulse is to be a slave to the impulse. To resist it is to show self-mastery, and emancipation from one's immediate tendencies. Whenever, therefore, those who wish to be loose encounter those who wish to exercise arbitrary power there is a clash, and those who stand between the two camps suffer. Confusion and conflict are the price society pays for abuse, on the one hand, and lack of self-control and discrimination, on the other.

For the nature of the second cause of the clash between authority and freedom—mistaking means for ends, methods for objectives—we may revert to the illustration from art. The analysis of the material and structure of a painting enables us to deduce several laws which operate in the production of a work of art. The motive of the artist is to produce a work that shall have æsthetic value, and he uses these laws as a means toward that end. But the work of art is not the sum total of these laws, and no æsthetic object can be produced simply by following certain laws of technique. It is easy, however, to mistake the laws for the art product itself. Thus, students of art believe that if they acquire skill in handling the tools and materials of art, they are artists. Certainly they cannot be artists without such mastery; but with nothing more than technical facility, they are craftsmen and not artists. Again, there is the notion that the path-

way to art appreciation is by way of an understanding of structure and form. But understanding of structure only leads to an admiration of the skill of the artist and not to an appreciation of what he has produced. I may remain completely indifferent to a painting as a whole, although I may recognize and admire the skill of the artist. The performance may be admirable, but the end result, the accomplishment, may nevertheless be mean and worthless. This mistaking of means and tools for the end which the means and tools are to promote is responsible in large measure for confusion in society, because rules of conduct which are the means for the building of character are taken for the character itself. Hence individuals pretend to possess certain virtues simply because they know what the accepted rules of conduct are, and they proclaim them aloud although their acts belie their words. Here is the cause for the pretenses and hypocrisies we found prevailing in the ethical realm. Where a rule of conduct is divorced from the person who is to use it, the rule becomes an end in itself which people will adopt but not necessarily apply. A tool is bound to be misused if a person is driven to use it when he does not know how or why, and does not wish to know. A really talented artist who is forced by someone—some authority—to use certain rules of technique will produce an abortive product instead of art. His very artistic nature is violated by such an imposition. In the same manner, impersonal rules of conduct forced upon individuals create a social group, the members of which cannot be true to themselves, and so they either disregard the rules privately, although they give their consent to them publicly, or they revolt against the rules and suffer social disapproval. This is true, however, only of those

individuals who have real talent for living, who can make an art of life. The non-talented person, in life as in art, if he is to produce anything at all, must follow rules given him. He himself has nothing to say and therefore can say nothing unless he is told what to say and how. And what he says under such conditions is never worth the saying. The person who has no self, no individuality, who is only one among many rather than one out of many, can follow impersonal rules because he has nothing else to follow. But he is a negligible factor in the progress of society. He can do in a routine way what has been done before, and get along, be an accepted and acceptable member of the group; but if all the members of the group were like him the group would stagnate. A society of outstanding selves would be a creative group, and in such a society order and stability would naturally prevail, since each self, because of its critical intelligence, would contribute a creative product, hence an orderly product, to the sum total of the whole. It would be a moral society of responsible individuals instead of merely an ethical group, with rules on the surface, but with internal confusion, revolt and hypocrisy.

Æsthetic percepts are judgments of beauty

Æsthetic Percepts.—An æsthetic percept is a judgment of beauty. What the nature of the judgment of beauty is, is best seen when it is contrasted with judgments of the good (ethical and moral judgment) and judgments of the true (scientific and philosophical judgments).

Let us consider three men gazing at a column of smoke pouring from a smokestack of a steel mill. One man says, "What a pity that so much power is going to waste, and I wonder what effect the smoke has upon the atmosphere and people who breathe it, . . ." The second man says, "Here

is the problem of labor and capital in the concrete as well as that of the relationship between man and man. A few men living in luxury on the sweat of others"; or, "Here is an example of civilization, just producing more and more without any clear idea as to why, wherefore, and what for." The third man says, "What a beautiful phenomenon!"

The three men are looking at the same thing, but they apparently do not *see* the same things. What is the difference? The first man's attitude is scientific. His interest is not in the smoke as a *phenomenon* but in what the smoke implies, in the inferences he can draw from it. The attitude of the second man is ethical-moral. He also is not so much interested in the smoke as a phenomenon, but in what it represents in terms of human beings and human problems. Both the first and second observers see the consequences and incidentals which arise from the smoke but which are not the smoke itself as a phenomenon pure and simple. They are interested in the *attributes* of the smoke. The third man sees the smoke as a phenomenon and as nothing else. He simply observes, without going beyond what it is that he observes. And what he observes is what the thing really and finally is, in itself—a *form*. The form is the essence or substance of the thing, since if the form were not present nothing would be present. An æsthetic percept is a judgment of the essence, the pure form of what is observed, what a thing ultimately is in itself, its true reality versus its attributes, or what a thing is finally in itself versus what is attributed to it by the observer.

Beauty is pure experience

An excellent illustration of the difference between the practical attitude of science-philosophy and ethics-morality,

on the one hand, and the æsthetic attitude of beauty, on the other, is given by Abercrombie.

I was staying a while ago with my family on the shores of Morecambe Bay. The news came one morning that a horse was in the quicksands: so all set off to assist in digging it out. I may say—not to make the story too thrilling—that there was no danger to us. It was a temporary quicksand, due to rain. Only the head, back and tail of the horse were above the ground, but it would not sink further: the sand had set firm all round—till we began to dig, and then it at once became a sort of porridge. It was a long business and horribly exciting. We could feel at our backs the menace of the tide; it was only a gleam as yet on the skyline—but everyone knows how the Morecambe tide comes in. Exciting, certainly; but the excitement was one of intense and practical anxiety. We were all the time calculating the possibility that the poor beast might be still embedded when the water was up to its nostrils; and we were trying not to notice the anguish of terror in its eyes and the quivering palsy to which exhaustion had reduced its pitiable struggles. But there was one member of the party who hopt about in pure candid untroubled enjoyment of the whole affair: this inexhaustibly interesting world had provided one more first-rate spectacle for his especial benefit. "Will the horse be drownded?" he kept eagerly asking. There was nothing callous in that: what the horse felt about it had simply never occurred to him: the only judgment to which the spectacle had been referred was the simple and immediate judgment. Was it a thrilling affair or not? Why, of course it was: the whole thing was most admirably arranged. And then came the final touch. The men were busily digging round; we were all hauling on a rope doubled endways round the horse's body; the owner was hauling on the horse's tail. But the tail and his hands were slippery with salt water; and just as we made a grand concerted effort,—the tail slipt through his hands and over he went, heels over head. Instantly there shrilled out a piercing keen peal of ecstatic delight; I have never heard laughter of a more unquali-

fied rapture: and I have never, I think, been more shocked by the intrusion of the *pure æsthetic* view of things into the world of moral or practical values. Severe remonstration followed: the unreasonable nature of laughter was made clear. But the excuse was irresistible: "I thought he'd pulled the tail right out!" That would, indeed, have raised the affair to an exquisite perfection. It was not true; but the instantaneous impression of it was accepted without question and enjoyed to the utmost—simply as a thing given.

Now this was pure æsthetic experience: that is to say, it was experience that did not look outside itself for its value. That small boy had still the faculty (alas, he will lose it too soon) of taking everything as it comes along and finding it immediately good or bad: of instantly deciding its value simply as experience, without requiring any other interest. I suppose that is why children are sometimes said to be natural artists: they at any rate live naturally in the condition which alone makes art possible. And I dare say, too, it is their purely æsthetic life which makes children seem to come among us "trailing clouds of glory." If heaven means anything, it must mean a state in which everything is immediately good in itself: intellectual or moral judgments would never be tolerated there.[1]

The good and the true as practical percepts, and the beautiful as an æsthetic attitude, differ in the following essentials: In the first place, the good is inclusive while the beautiful is exclusive. The good is inclusive in that its positive and negative aspects can exist at one and the same time. Thus, what is good for one person may be evil for another, or what is good today may be evil tomorrow, or what is good for an individual may be an evil for society, and what is good for society may be an evil for the individual. Furthermore, the same thing may be both good and evil for the same person

[1] ABERCROMBIE, LASCELLES, *An Essay towards a Theory of Art*, Secker, 1922, pp. 19-22.

at the same time as, for instance, "I like this but I know it is bad for me."

The beautiful, on the other hand, is exclusive. A thing cannot be both beautiful and not beautiful at the same time to the same person, nor can it be beautiful one day and not beautiful the next. That which calls forth beauty in me today may fail to do so tomorrow; but it has not become unbeautiful just because it does not produce its effect—it is only that at that particular time I am indifferent to it. This becomes apparent, once we consider a by-product of beauty, namely, pleasure. The beautiful is always also pleasurable, although that which is pleasant is not necessarily for that reason beautiful. Beauty and pleasure are not synonymous, although coexistent. Now, if I feel beauty today I also experience pleasure. But when the object that arouses beauty in me today fails to do so tomorrow it does not give me pain, I am only indifferent to it for the time being. The beautiful is thus a joy forever, in that it always arouses a response; only the degree of beauty experienced may vary from day to day. The music I greet with joy on one occasion does not annoy me, rile me, or become intolerable to me on a second occasion, although I might listen to it with indifference when repeated.

But the beautiful not only excludes the non-beautiful, but also has no room and does not tolerate the evil. In other words, a thing cannot be both beautiful and evil; but *as beautiful*, it is always necessarily good. The beautiful and the good, as we have seen, belong to different realms, the latter to the realm of ethics, the former to the realm of art. Consequently, when an object of beauty is judged to be evil the judgment is no longer æsthetic but ethical. The standing

battle between the camps of "art for art's sake" and "art for man's sake," as well as the confusion as to the relationship between the beautiful and the good, the true, and the useful, are all due to a failure to ascertain the position of beauty as a unique and distinctive type of experience. Although beauty serves man, although it has its relationship to the other values, its service is of a kind entirely its own, distinct from the services rendered by other experiences. And one of these distinct services is that the beautiful, as such, is ever of the nature of a positive attitude toward an object, whether in the field of ethics or morality or of art. The beautiful, as beautiful, is always also on the side of the good and moral, and no one can live through a moment of beauty without at the same time being raised in moral stature. Beauty refuses to acknowledge the existence of negatives. To it the world always "means intensely, and means good."

To art:

> The year's at the spring;
> The day's at the morn;
> Morning's at seven;
> The hillside's dew-pearled;
> The lark's on the wing;
> The snail's on the thorn;
> God's in his heaven—
> All's right with the world.

In the second place, the good is a derived experience, while the beautiful is an immediate and intrinsic experience. When we say that an object is good, we imply that its goodness is due to its rendering a certain service of which we stand in need. The goodness of an object is not inherent in the object, is not of its essence and substance, but of the nature of an attribute which arises from a function that the object

fulfills. The good is something *about* the object, but not *of* the object; it is always derived, relative, and not intrinsic or absolute. The good is ever dependent upon something that lies outside of the object itself. A thing is always good because of something; it does not stand on its own feet, but owes its existence to something beyond itself.

But the beautiful stands on its own inherent and intrinsic merits. A thing is not beautiful because of anything outside of itself. The beauty and the object are one and the same. A thing is beautiful because it is beautiful. It owes its beauty to nothing, it leans on nothing, it is derived from nothing. It needs no justification. It is self-sustaining, self-supporting and self-sufficient. Beauty is an aristocrat that guards jealously its exclusiveness and is inordinately proud, even arrogant, about its independence. Beauty is not an attribute, but an essence; not anything *about* the thing, but *of* the thing; not *because*, but *just so*. "Beauty is not dependent on associations with other perceptions or sensations; it is by itself an ultimate . . . and has no necessary connection with other qualities, mental or corporal."

It is in these traits that the unique contribution of beauty to human experience lies. Beauty emancipates the mind from all trappings with which ordinary experience is hedged about —meanings, relationships, uses and consequences. To experience beauty, "we need bring with us nothing from life, no knowledge of its ideas and affairs, no familiarity with its emotions. Art transfers us from the world of men's activities to a world of æsthetic exaltation. For a moment we are shut off from human interests; our conceptions and memories are arrested; we are lifted above the stream of life."[1]

[1] BELL, CLIVE, *Art*, Stokes, 1913, p. 25.

It is because of the nature of the experience of beauty that we find the claim made for art that through it we come in contact with true reality. For what is it that constitutes the essence, the reality of a thing? It is all those elements without which it could not be what, in itself, it truly is—that which inherently belongs to its very substance. When the mind begins to describe, to explain, to evaluate, to relate, to interpret and to judge, attributes are created which originate from the object but are not of the object. But during the moment of beauty the object is stripped and cleansed of all impositions and vestments ordinarily imposed upon it; it is present to mind in all its naked purity, shorn of all adornments with which more ordinary experiences are burdened and disguised. It is the unique glory of the æsthetic feelings, "that they have nothing to do with business, with the adaptation of means to ends, with the bustle and dust of life. They are impractical and purposeless. They serve no interest and further no cause. They are self-sufficing, and neither point to any good beyond themselves, nor overflow, except by accident, into any practical activities."

Art takes life out of the commonplace and the ordinary and lifts it into the clear atmosphere of the unique and distinctive.

. . . it is the very essence of æsthetic experience that we disconnect it from our future. During it we look neither before nor after; only the now exists for us, freed from all that has been or will be. And we recognize a work of art by its power of giving us this freedom. Art is infinitely diverse in content and in medium; the work of art may be, considered in other terms, a trifle like *Cosi fan tutte*, or a terror like King Lear; in reference to actual experience it may be matter for laughter or tears, or neither; it

may be the solution of a practical problem, like architecture, or of a problem almost geometrical, like some music and painting; but, behind all these diversities, its essential quality for us is that it frees us from the chain of events which in other experience binds us to our past and future.

Yet, as soon as the experience is over, we are again bound by that chain and think in terms of it. That is why we find it so hard to think rightly about art, and why it at once excites our curiosity and baffles it. After the experience we are not what we were during it; the artist himself, we may guess, is not, after the process of creation, what he was during it; and so even he often tries to value his own work in terms of something else. He does not remember that the practice of art is to him really a different kind of being—an experience in which he escapes from the chain of events and lives in the moment; and that he values it for that and for no other reason.[1]

The closer art resembles life as it is, the poorer it is as art; and the closer that life attains to the state of art, the more beautiful it becomes. Only that in life is beautiful which approximates in some form and to some degree the state of art. For everything in life is the doing of something for the sake of something else, a striving for something beyond the thing itself, the doing of a thing not for its own sake but for the sake of some good the action might further, or some evil it might alleviate.

The more thoroughly I experience a story or a play, the more I am absorbed in it, the less do I exercise my moral judgment on the characters; indeed, the moment I begin to exercise such a judgment, to say to myself—This man ought not to do that, I am ceasing to be absorbed in the story. So also if I ask myself—"Why does this man do that?" I am ceasing to be absorbed in it, I am passing from the experience of the work of art into an intellectual

[1] CLUTTON-BROCK, A., *Essays on Life,* Dutton, 1926, p. 80.

activity of my own; and the writer who provokes me to this question in the midst of my experience of his story is failing with me, whether it be his fault or mine. I may, after I have read *Hamlet* or seen it acted, fall to asking myself what is the explanation of his conduct; but, if I do, it is no longer a work of art to me; I might ask the same question about a real man; and, if I do ask it about Hamlet, I am treating him as if he were a real man, not a character in a play.[1]

Numerous evidences can be cited in support of the view of the nature of beauty here presented. Let us take common daily experience. We speak of mother love as being beautiful because the mother loves the child for its own sake, as an end in itself, irrespective of anything about the child, whether it is good-looking or not, whether it is good or bad, whether it gives her pain or joy. The child is a child, apart from its qualities and attributes that lie beyond its immediate intrinsic being. Likewise we speak of a beautiful walk; the activity is for itself and not an errand or duty. We speak of having had a beautiful time when we are engrossed in the activity for itself and not because the activity is forced upon us or because we wish to produce a good effect. A child's play is beautiful, but when play is forced upon it because we think it needs the exercise, or in order to teach it coöperation and sociability, the beauty is lost and the effect becomes immediately noticeable in the attitude of the child. In other words, the term "beautiful" is applied commonly to those activities or results of activities that give the impression of being engaged in as ends in themselves, in contrast to activities or their products having an aim beyond themselves which may be called useful, or ethical, but not beautiful.

[1] *Op. cit.*, p. 89.

Religious Percepts.—The idea of God and of his relationship to man is the focal point of religion. Without God, religion would be as meaningless and empty as art minus beauty. To the religious mind, God is the reality of realities, the source and fountainhead of everything significant and permanent in the universe, and particularly in man. The truly religious person is sunk in God. He lives by, in, and through God, and without Him life becomes futile and the world empty.

Religious percepts are judgments of moral beauty

There is nothing in religion that need be taken for granted as being beyond objective demonstration and rational proof —at least, no more so than in science. There is a science of religion as there is a science of anything else. Science as a whole consists of a system of generalizations which were inferred from particular natural occurrences and then applied to the interpretation of the occurrences. Now the saint, the prophet, the mystic, are to religion what a chemical substance is to the atomic theory. They are the general manifesting itself in the particular. They are religion functioning as life, God revealed in man, the spirit become flesh. The religious genius is the observable material for a behavioristic analysis of the nature of the religious experience in general, and there is no more call for relying upon mere metaphysical speculation concerning what religion is than there is in any other sphere of scientific investigation. "Religion," says Whitehead, "starts from the generalization of final truths, first perceived as exemplified in particular instances. These truths are amplified into a coherent system and applied to the interpretation of life."

Religion can be studied behavioristically

The study of the nature of the religious experience reduces

itself, therefore, to an analysis of the nature of God and His significance for man, as revealed in the utterances and activities of God-intoxicated minds.

What are the traits of the religious genius as exemplified in his conception of God and his behavior toward his fellow men?

The religious genius is predominantly God-conscious. God is the supreme reality overshadowing all other realities. This God is not a philosophical God, or a pantheistic God, or a universal ideal, but a most intimate personal Being, a friend, a father, a helper, a support, a rock and a foundation. He is a personality, possessing definite personality attributes and having objective existence apart from man and nature, but existing in them and revealing Himself through them. He is to be spoken to, remonstrated with by man, and He in turn speaks to, and remonstrates with man. He is pleased and displeased, angered and placated. He rewards and He punishes, and He gives and takes away.

Religious genius is God-intoxicated person

The conception of God in all religious literature is primarily and essentially anthropomorphic. Any religion that eliminates this concept also loses its religious significance, since it has lost its God. And a godless religion is no religion. Whoever rejects an anthropomorphic God also repudiates by implication, even if not by intention, the prophets, the mystics, the saints, and all outstanding religious characters of the ages. Whatever the prophets were, and whatever they advocated, that they did because of a God whom they knew intimately, who spoke to them, ordered them, directed them. They express not their own thoughts or desires but the thoughts and desires spoken into their ears as commands.

Woe is me, for I am undone!
Because I am a man of unclean lips,
And I dwell in the midst of a people of unclean lips:
For mine eyes have seen the King, the Lord of Hosts!
And he said unto me, son of man,
Go, get thee into the house of Israel,
And speak with my words unto others.

Then the Lord put forth his hand,
And touched my mouth,
And the Lord said unto me,
Behold, I have put my words in thy mouth.

There are, of course, differences in degree and kind of anthropomorphism, from the primitive tribal gods to the God of Jesus. But a god minus personal attributes is not a god, but an empty sound for philosophers, logicians and theologians to play with.

A second trait of religious geniuses is their unique attitude toward their fellow men. While they stand out apart from other men as solitary, lonesome figures, their interest in human beings is intense. Next to God, man is their prime thought. They are selfless in their regard and concern for others. To their own sufferings they are indifferent, often inviting and welcoming hardships, but for the afflictions of others they have the greatest compassion. The Old Testament prophets are unanimous in their ferocious denunciation of injustice and abuses; and Jesus, who deals gently with sinners whom society condemns, is merciless with those who exploit the poor, and for the rich He can find no place in heaven.

And a lover of man

What is the relationship between this vivid awareness of God by the prophet and his championship of the cause of men to the point of complete self-abnegation?

The answer lies in the nature of God as conceived by the God-full mind, and of man's relationship to God.

The references to God in religious literature are always in terms of human qualities such as mercy, justice, kindliness, and other mundane virtues. But in God these exist in an absolute form. In God they are essences, in man but attributes. That is, God *is* these qualities, while men only *possess* them. Now essences are pure and perfect, while attributes are impure and imperfect; or, in other words, attributes are but imperfect imitations of essences. Thus beauty is an essence, while a work of art is an attribute. No matter how beautiful a work of art may be, it can be conceived to be still more beautiful, to come closer to absolute beauty. Each work of art is therefore at its best but an imperfect copy of perfect beauty. An essence is that without which a thing would not be what it is. The essence of a work of art is beauty. If it did not contain beauty it would not be a work of art. But even at that, works of art are not pure, perfect beauty, since some are more beautiful than others, and the most beautiful not as beautiful as they might be. Hence works of art partake of the nature of beauty, are parts of it, but not the essence of beauty, the whole of it. Likewise, God is the whole, the absolute, the essence of the qualities which men possess in part as attributes. It is because of this that God is felt to be the reality of realities, since the reality of a thing is that which it is as a whole, and not in its parts. The whole is more than its parts, although its parts contain elements that make up the whole, or the whole could not be formed out of them. The parts of water are atoms of oxygen and hydrogen. But water is more than oxygen and hydrogen. The reality of water is the unit, the whole, that emerges out of the parts, and more than the

God is holy

parts, since the whole possesses properties that are not present in the separate parts. Men are thus imitations of God, the imperfect parts of a perfect whole, the attributes of an essence. They partake of His nature, but are not He. They are created in His image. They are a shadow, of which He is the ultimate reality.

This direct experiencing of God as a Being in whom human attributes exist as pure essences, creates in the prophet a unique attitude toward man which explains his vehement denunciation of injustice and abuse. God is holy, the holy of holies, and everything coming from Him or associated with Him is holy—His words, His law, His sanctuary, His children. The holy is the majestic, the sacred, the hallowed, the awesome. It is not to be violated by being trespassed upon. It is exclusive, all-complete and all-sufficient. It tolerates nothing that is not of its own nature, and is not to be imposed upon. It is to be contemplated for itself in awe and reverence and not to be encroached upon. It must ever induce, as Plotinus says of beauty, "wonderment and a delicious trouble, longing and love, and a trembling that is also a delight."

And so is man

Now God is the father and men are His children. They are made in His own image. He is their essence, they are all His attributes. They are related to Him as parts to a whole. As a part is incomplete and therefore imperfect as compared with the completeness and perfection of the whole, so are men imperfect in the light of the perfection of God. But men partake of God's nature, and their imperfections are a reflection of His perfection.

What is man, that thou art mindful of him? And the son of man that thou visitest him? For thou hast made him but little lower than God, and crowned him with glory and honor!

Now men are God's witnesses, as a work of art is a witness of beauty. He is imminent in them and they are expressions of Him. It follows from this relationship between God and man that since God is holy His children are holy. The attitude of man to man must therefore be as the attitude of man to God. To shame, abuse or belittle a human personality is to trespass on the holy. It is a violation of God's presence in man. A sin against man is a sin against God. To sin is to violate the divine in oneself or in others. Every such infraction means the fall of man from his godly state, and brings evil into the world. By origin, as an offshoot of God, man is necessarily good. He creates evil by forgetting his Maker. Good is the only true reality, since God is the ultimate reality and supreme goodness. All evil is negative, in that it owes its existence to a violation of man's true state as a godly being. Religion is therefore the art of life, the beauty of human relationships. It is holiness operating in human conduct. It is worshiping the Lord in the beauty of holiness. The essence of religion, in so far as human conduct is concerned, is that every deed, act, thought and idea, no matter how lowly, trite, ordinary, shall be a work of art, a mirror of divine perfection, a thing of beauty, and not only a joy forever, but a joy for everyone; that men in their relationships shall reflect the divine essence in man, which is shared by all; that all men shall lose their selfishness, their differences, in the divine unity, and so eliminate discord from the earth.

Religion is the beauty of holiness

IV

Abnormal Percepts

An illusion is a false perception. The physical nature of the stimulus and the mental response to it do not agree. It is

a misinterpretation of sensations. Some illusions are universal. They are common to all normal people. These are essentially misinterpretations of objective stimuli, due to the structure of the sense organs. The accompanying illustrations are instances of universal illusions. Fig. 15. Individualistic illusions, or illusions that characterize particular individuals, have a subjective cause in expectation. A person imposes some pet idea upon the objective stimulus and it is this subjective factor he experiences rather than the objective fact. In the accompanying illustration one can see a rabbit or a duck, depending on what he is told to look for. Fig. 16. A cloud or a blot of ink on paper will be seen by different persons to constitute any number of different objects or animals. A person walking in the country in the dark will interpret a bush to be a man or an animal. Ghosts are seen everywhere by one who is looking for them.

Illusions

An hallucination is a percept that has no objective stimulus, or a percept that is altogether at variance with an objective stimulus. It may be therefore defined as an exaggerated illusion. Hallucinations are altogether individualistic. Their background is some strong emotional factor. When we are suspicious of a person, any move on his part will be interpreted in terms of the suspicion. The hallucination is always more real to the person having it than the actual reality. It is the determining factor in his or her behavior. The voice is actually heard coming from outside, the object in the vision is actually seen and has been touched, and a complete description of what was seen can be given. The following is a case of visual hallucination:

Hallucinations

This patient was a very cultured lady, a widow. On her husband's death she had to adapt herself to her altered circumstances;

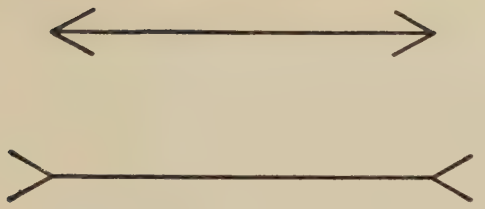


FIG. 13.—WHICH IS THE LONGER LINE?

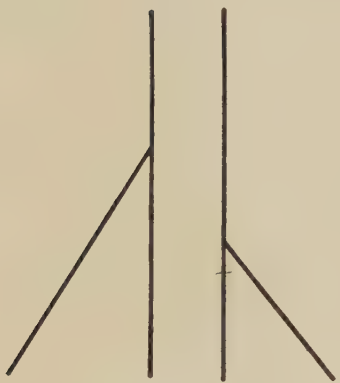


FIG. 14.—WOULD THE DIAGONAL LINES MEET AT POINT OF INTERSECTION AT LEFT?

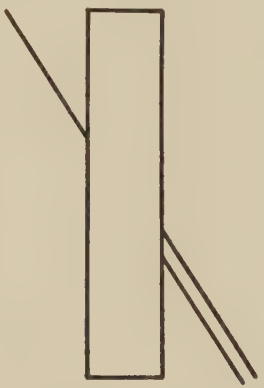
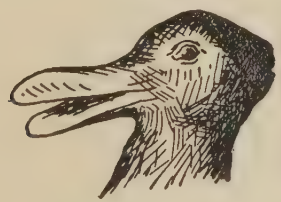


FIG. 15.—WHICH OF THE TWO OBLIQUE LINES ON THE RIGHT IS A CONTINUATION OF THE LINE ON THE LEFT?



Duck or Rabbit ?

FIG. 16.

and having little knowledge of business, she fell into debt, and borrowed money from a cousin to whom she had shown much kindness in earlier days. When she failed to repay the money this cousin began to pester her for it roughly, and was forever saying to her, "When are you going to get me the money? If you don't bring it now, I'll tell your son" (who helped to support her). Her worries ended in . . . an attempt at suicide which led to her internment in an asylum. The third day after her arrival she began to have hallucinations. "Does he come in here, too, the brazen fellow?" Asked whom she meant, she replied, "My cousin—he wants his money. He is saying, 'When are you going to get me the money?' " "Where is he?" "There by the cupboard; don't you see him? Surely you must see him. Do you want to make me out a fool? I am not crazy. Look, he's winking at me to say nothing about him and his villainy, the rascal. But I'm just going to tell it all. There! now he's putting his tongue out at me. I can't look at him any longer. I only hope he'll do me no harm." As soon as she turned her gaze away from the spot where the figure appeared she saw it no more, that is, it did not follow the movements of her eyes. It appeared to her "by the cupboard," more precisely as coming out from behind it. She was afraid her cousin might have followed her and hidden himself, and might suddenly spring out of his lair. If any one came between her and the spot where she localized the figure, so as to hide it from her, its localization changed, and she saw her cousin looking over the other person's shoulder.[1]

Hallucinations may be incited by drugs and certain diseases, such as cocaine, hashish, fever, deliria, delirium tremens. They are also induced by hypnosis.

A delusion is a false belief. What the person believes to be true and what actually is true are at variance. John Smith believes he is Napoleon. He has a grandiose delusion. Or he believes he is being persecuted. He has a persecutory delusion.

[1] STÖRRING, GUSTAVE, *Mental Pathology,* Swan Sonnenschein, 1907, p. 33.

Delusions

There is a close relationship between delusions and hallucinations. The deluded person may hear voices telling him that he is the rightful heir to a throne or a great fortune. Or he hears warning voices telling him to flee some enemy. A characteristic of delusions is that the person misinterprets everything that happens in his environment as bearing upon himself. A perfectly meaningless gesture or gaze on the part of even a stranger is taken as a threat or a warning or an invitation. A woman interprets the position of a stamp on a letter she receives as a sign that the writer is planning to do her some harm. A spot upon the plate at a meal is a sign that there is poison in the food.

In "Old Maids' Insanity," for example, an unmarried woman of considerable age, and of blameless reputation, begins to complain of the annoying attentions to which she is subjected by some male acquaintance. She explains that the man is obviously anxious to marry her, and persistently follows her about. Finally certain trifling incidents lead her to believe that he is scheming to abduct her by force, and on the strength of this she perhaps writes him an indignant letter, or lodges a complaint with the police. Investigation follows, and it is found that the man is not only entirely innocent of the charges levelled against him, but that he has never expressed the least interest in the lady, and is probably hardly aware of her existence. The lady is certified to be suffering from "delusions of persecution," and removed to an asylum.[1]

An obsession is a fixed idea or percept which compels the person to act in a certain way under certain conditions, and colors the entire personality. The person may be aware of the obsession and may even attempt to get rid of it, but it persists in controlling his mental life, and consequently his

[1] HART, BERNARD, *The Psychology of Insanity*, p. 122; copyright 1928 by The Macmillan Co.; reprinted by permission.

actions. A woman assiduously examines every bank note that comes into her possession. When asked the reason for her action she replies: "I do not know why I do so, but I simply cannot help it. Whenever I see a bank note, something forces me to examine the number. Of course I am distressed at my foolish behavior, but the impulse is absolutely uncontrollable." In other words, the sight of a bank note arouses a system of ideas, whose development the patient's personality is altogether unable to control. Whatever she may herself desire to do, this system will pursue its course until it has achieved its end, and she will be compelled to look at the number. She is, of course, perfectly aware of her action, but cannot alter it or prevent it. A chaste woman cannot banish words or phrases that obtrude themselves on her mind. A man must examine the door repeatedly to see if it is locked, or the gas, whether it is turned off. An instructive example of normal obsession is afforded by the following account of an experiment.

Obsessions

About two hundred students in educational psychology—almost all of them were seniors—were asked a series of questions which they were to answer in writing. The answers to these questions were handed to the instructor at the next meeting of the sections two days later. The two questions asked that bear directly upon the subject of this paper were as follows:—

1. "Do you have or have you had any fixed ideas?"
2. "Do you have any ideas which involuntarily come to you when fatigued?"

The writer explained that he meant by a fixed idea, any idea which came unsolicited and remained even when the subject tried to get rid of it. The term obsession was not used as it was feared that this term would carry with it the idea of a pathological condition, and consequently stand in the way of an honest confession

on the part of the student. The student was not required to describe his fixed ideas, but he was requested to do so if he were willing. Of the two hundred or more students who were asked these questions, about twenty-five per cent said that they either had or did have fixed ideas. Many of them did not attempt to describe their ideas, but a large percentage did; and from these we gain an idea of the character and extent of the obsessions common to such a large percentage of normal individuals. The following are some of the answers given to these questions:

"I used to have a fixed idea of a monstrous stone so high that I couldn't see its top, and the stone would begin to roll toward me menacingly. I haven't had it, however, since I was a little youngster. So now it is very vague. Only the fearful sensation remains."

"When I am fatigued I always get the idea that I must solve some weighty problem that is awaiting me. I don't know what sort of problem it is to be solved, but whatever it is, it makes me worry because I realize it is my duty to unravel it, and the power to do so is just beyond my reach. I have another real problem which I try to solve when I am fatigued. I can see a table with objects upon it. This table moves upward through the air until it touches the ceiling. The objects go on through the ceiling, then I turn the table upside down and all of the objects stay on it. I try to get the table to touch the floor and have the objects go right through the floor as they did through the ceiling. The distressing thing about this is that I can never get the table clear down to the floor. It seems as if it were always an inch above it. If I try to think of it a half-inch from the floor it usually ascends about three inches higher."

"I have had and still have a fixed idea that causes me any amount of discomfort. I don't remember ever being seriously injured with a knife wherefore I should feel great fear toward one. I can't imagine where I ever developed such a feeling of perfect terror for that object. The thought of it comes at most inopportune times when there is no occasion at all for its appearance. I can be talking on an apparently interesting topic of conversation when all at once without any warning, whatever, I shudder as I feel the blade of a

knife hurting me. I know it is ridiculous to imagine that I am being cut, but I cannot help being frightened. The knife seems to wound me in various places at different times. Sometimes I can feel the sharp blade in my mouth and I am perfectly certain that in real life it never was there. I haven't told anyone of the queer sensation for I do not wish to be considered abnormal. I was discouraged from telling by my mother, who, noticing me shudder on one occasion, said I had either a very vivid imagination, or that I should apply for a place in a psychopathic ward. I prefer to be at large . . ."

"For three years, whenever I allowed myself to be idle, I was obsessed by the idea that I saw a large roll of carpet which rolled or unrolled itself eternally. As for recurrent words, I have a habit while dreaming of different things of breaking in on my reflections with the words, 'and then' or 'and after that.' The idea of the coolness of the grass is the one which comes to me most often when fatigued."

"When I was about eight years of age I had a fixed idea. I thought I was going to cut my throat from ear to ear with a certain large butcher knife in my grandmother's kitchen. I couldn't throw off the idea. I was afraid to go near the knife. This persisted for about two weeks, then it gradually wore off. When fatigued certain combinations of words and letters recur again and again. Often I am wholly unaware of their origin. For instance the words 'sy,' 'cip,' have come to me over and over again the last few days, and I am absolutely ignorant of where or when I heard or saw them. Often at night when very tired, just before I fall asleep, I read page after page of a large magazine in which there is absolutely no meaning—just a jumble of words. Yet I feel no irritation and my mind is absolutely satisfied with the jumble. I read down the columns, turn the pages and am aware of a half-tone illustration in the middle of the page but never see it distinctly."

"Whether it is to the point or not I do not know—but for the past ten years I have repeatedly found myself when thoughtlessly

scribbling, writing the name 'Claudius.' I have no idea why this is but it certainly has stuck."

"When fatigued I always picture vast horizons with a single occupant—as for instance, a single ship upon a large sea, or a vast desert in the middle of which is a single tent—outside, a camel and then a lonely Arab on his knees toward Mecca . . ."

In studying these obsessions in normal individuals one is struck by two things: First, that without external assistance the obsession in so many cases seems to run its course and disappears, or at least loses its emotional force; second, that in a large percentage of these cases the beginning of the obsession goes back to childhood.[1]

A *phobia* is an abnormal fear. Some common phobias are:

Phobias

1. Acrophobia, fear of high places
2. Agoraphobia, fear of open places
3. Algophobia, fear of pain
4. Anthropophobia, fear of men or of some particular man
5. Astraphobia, fear of thunder or of other meteorological phenomena
6. Botophobia, fear of cellars
7. Claustrophobia, fear of closed places
8. Ereutophobia or erythrophobia, fear of blushing
9. Gynophobia, fear of women or of some particular woman
10. Hematophobia, fear of blood
11. Misophobia, fear of contamination
12. Monophobia, fear of solitude
13. Neophobia, fear of the new or unfamiliar
14. Nyctophobia, fear of the darkness
15. Ochlophobia, fear of crowds

[1] BERRY, C. S., "Obsessions of Normal Minds," *Journal of Abnormal Psychology*, vol. xi, pp. 19-22.

16. Pathophobia, fear of disease or of some particular disease
17. Peccatiphobia, fear of sinning
18. Phobophobia, fear of fear, fear that one will be afraid
19. Taphephobia, fear of being buried alive
20. Thanatophobia, fear of death
21. Theophobia, fear of God
22. Toxophobia, fear of poisons or of being poisoned
23. Vokephobia, fear of returning home
24. Zoöphobia, fear of animals or of some particular animal[1]

Dreams

Dreams come under abnormal percepts because of their usually marked deviation from ordinary experience. They represent a distorted, fantastic, exaggerated, incongruous world, in comparison with the world of normal life. The most prominent characteristic of a dream is its dissociations, at least in a slight degree, from the person's normal interests and activities. Even the most realistic dream contains some element of phantasy and improbability. A dream may be defined as conscious phenomena occurring during sleep. Sleep has well been defined as a state during which "the sensory activities have become partial and irregular, when there is no present reaction to the environment or orderly preparation for a later one." In such a state the brain seems to have been freed from its usual discipline and to engage in free play. The brain activity in sleep has been well compared to an electric sign with switches out of order. The main features of dream life are set forth by Dr. Stiles as follows:

[1] BRIDGES, J. W., "Outline of Abnormal Psychology," Adams, 1925, pp. 82-83.

All people probably dream, though it is evident that the power to recall dreams is a most unusual endowment. It can be cultivated in some degree, but only if the waking can be unhurried by the pressure of daily duties. Few are so luxuriously circumstanced that the ideal can be fulfilled. Even though the memory of our dreams may be quite indefinite, we can usually answer a certain important question in respect to their character. This is the following: Have the dreams been concerned with present and pressing anxieties and interests or have they seemed remote from these? The reply has a possible bearing on our health and outlook.

Nervous fatigue is often characterized by a difficulty in detaching ourselves from a tyrannizing interest. Such fatigue may be held to exist when the interest is not automatically relinquished on going to sleep. Its continuance in dreams implies that rest is denied to the very departments of the nervous system that stand particularly in need of it. If healthful dreaming has in any degree the virtue of a vacation, this perversion of the mental life appears by contrast as damaging overtime. A warning is sounded to lighten the stress if possible or, failing that, to establish new interests that shall make for a balanced life.

It may happen that the anxiety disturbing happiness and threatening health enters the dreaming consciousness in disguise. The haunting fear or the irksome duty may not be recognized as it figures in the fantastic allegories of the night. But there will still be a similarity between the emotion of the dream and that of the waking mood. It might require an expert in psychoanalysis to interpret the action, but the temperamental coloring may be suggestive to any one.

Havelock Ellis has convincingly pointed out that one of the most marked tendencies of the dreamer is to set off parts of himself and view them as though they belonged to others. When he is stimulated in a manner that might be expected to produce pain he does not think that he suffers. Instead he sees some one else in trouble. If his heart palpitates he watches some sort of struggle; perhaps he follows the efforts of a swimmer to stem a swift current. Obstruction of the nose has been symbolized by a fish out

of water and so unable to breathe. A headache, which was found on waking to be quite severe, was presented in sleep as a massive door tightly closed.[1]

Psychoanalysis has made the dream extremely prominent. It recognizes two aspects of any dream: its manifest content and its hidden meaning. According to psychoanalysis, a dream is a symbol, a sign whose meaning is other than itself. Hence the practice of dream interpretation in the treatment of certain forms of functional disturbances. By interpreting the hidden meaning of the dream, the psychoanalyst hopes to discover the cause of the patient's trouble. The following is an instance of dream interpretation:

A woman of about thirty years of age had a morbid horror of cats, somewhat like that of the late Lord Roberts. She could hardly bear to remain in the same room or even the same house as a cat. She narrated the following dream: "I was standing with something in my hand, which I was holding very tightly. I looked down and to my horror saw that I was holding a kitten, which I had squeezed to death. I was very distressed, because, although I detest cats, I would not willingly hurt one for anything."

The circumstances of her life about the time of the dream were these. She had applied for a post that was higher than the one she was holding. She held a certificate granted by an examining body, which we will call X. She was chosen for an interview but discovered that the members of the board before whom she appeared were interested in another examining body (which we will call Y) and refused to consider the certificates issued by X.

She applied for a second post, and was again selected for an interview. She discovered, however, that the members of this second board were interested in Y, and refused to recognise the certificates of X. Consequently she declined the interview.

[1] STILES, PERCY G., "Dreams," *Hygeia Magazine,* vol. v, April, 1927, pp. 167-168.

She applied for a third post, and at the same time wrote to the secretary of X, stating her experiences, and saying that X should take measures to see that the holders of its certificates were treated fairly. It was now that she dreamed the dream recorded above.

In reply to a question, she stated that the first thought that came into her mind when she thought of a cat was deceit. Deceit made her think of a girl who had been sent into a room to dust, but who began to read instead of working so soon as she found herself alone. This she admitted was a personal experience. The person who used to send her to dust was her elder sister.

The elder sister dominated her a great deal. She did not resent this very much. What she could not forgive in the elder sister was her favouritism for a younger sister. The latter was very pretty, whereas the subject was considered plain. As a small child she had crooked legs, straight hair, and a cast in one eye. She has grown out of these defects, and now realises their unimportance. But they used to result in a good deal of praise for the younger sister, whilst she herself was ignored. The younger sister was taken out a good deal more, "shown off," and dressed in a prettier way. She states that the mother and elder sister always used to say that the two girls were dressed and treated alike, but that she was convinced that the younger sister was favoured.

She says that the preference for the younger sister used to make her very miserable. She used to weep about it, and used to feel jealous.

At this point she was asked, "What is the name of your younger sister?"

"Katherine," she replied.

"Used you to call her Katherine?"

"Oh, no, never," said she. "We used always to call her Kitty *. . . but I never wanted to kill my sister!"*

It is interesting to notice, in this case, that without any suggestion on the part of her interlocutor, the subject suddenly realises that the cat she consciously hates is the sister of whom she used to be so jealous. The vindictive thoughts that were felt in early childhood are repressed so soon as she is able to realise that they are

"wicked," and are directed towards a harmless substitute, a cat. The hatred still lives. Only its expression has been repressed.

The occasion of the dream is one that repeats in outward form the circumstances of her early childhood. The candidates who hold the certificates of Y are unfairly preferred to her. Hence these stand in relation to herself as "Kitty" used to stand to her. Her action in writing to X is designed to enable her to defeat her rivals, as her once-cherished plans against "Kitty" would have enabled her to defeat her sister. Her wish is to be successful against rivals. Hence the dream shows her as crushing a "kitty" to death. . . . The questioning brings into consciousness the repressed attitude towards her sister, whom she has now learned to love. Hence there are in consciousness two opposed judgments, *viz*:—

(a) I want to kill my sister

(b) I do not want to kill my sister

Since no normal human being is able to entertain as true at the same time two judgments, one of which is the contradiction of the other, one of the two must be destroyed. In the case in question (a) is destroyed, because (b) is regarded as true. . . . As a result, the fear of cats is completely gone.[1]

[1] GREEN, G. H., *Psychoanalysis in the Class Room,* Putnam, 1922, pp. 156-159; reprinted by permission.

CHAPTER X

RECALL

Questions this chapter seeks to answer: What is the phenomenon of recall and what is its significance? What is imagery and how does it differ from memory? What is forgetting and do we ever forget? What are subconscious memories and why are they important? What is the point of view of psychoanalysis? How is the subconscious explored? What are some evidences that there is such a thing as the subconscious? What is association of ideas? What is dissociation?

I

The Nature of Recall

With recall we go beyond perception into the mental realm of imagery and memory. To recall is to have percepts in the absence of their physical stimuli. Recall is a mental power that makes possible the use of past experience when that which caused the experience is not objectively present. It means the emancipation of mind from the dominance of matter. By the power of recall mind can manipulate matter in its absence. I can recall a situation, bring it back before me as a mental picture, and work with it, plan and scheme what I shall do when I am once more confronted with it. Recall makes it possible for me to adjust myself to

Recall is the conscious use of the past in the present

a situation which does not confront me at present, but which may confront me in the future. If there were no higher processes than perception, we could not work on a situation unless it were physically before us. With perception alone, thinking and conversation would be limited to objects within our immediate environment. Recall thus opens up a vast field of mental experiences beyond the confines of perception. It is conditioned upon perception as perception is conditioned upon sensation. But just as perception contains sensation, but supersedes it, so recall contains perception but is a mental step above it.

Recall occurs either as imagery or as memory. When I utter the word "Napoleon," there rises in your mind a picture, a mental photograph, of the man. The mental photograph is an image. The image arises spontaneously with no effort on your part. If I ask you, however, to tell me something *about* Napoleon, you at once *try to do something mentally*. This mental effort gives rise to the phenomenon of memory. We shall now turn to an examination of these two aspects of recall, their nature and the relationship between them.

II

The Nature of Imagery

Images are centrally aroused percepts

The mental processes involved in the image are probably the same as those of the percept, only that in the former the processes are centrally aroused while in the latter they are externally aroused. The image has a stimulus, as does the percept; but the stimulus for the image is inner, for the percept it is outer. The outer stimulus is, however, the basis of the image. We can never have an image of anything that

was not first experienced in some form as a percept. The image must have a stimulus, but it is not external to the brain. But the internal stimulus, whatever its nature, was originally itself a mental response to an external stimulus. Images are not conjured up by magic out of nothing. They have a physical basis both in the brain and in the objective world. And there is a direct connection between whatever it is that happens in the brain that excites the image, and what makes this happening in the brain possible, namely, the objective stimulus that caused the percept of which the image is a mental copy. Thus the internal stimulus is made possible by the external stimulus.

The difference, therefore, between an image and a percept is the physical antecedent. A visual percept has for its physical antecedent the impinging of light waves upon the retina. But the visual image does not have such an antecedent. Its antecedent or stimulus is somewhere in the brain. What the nature of the cerebral stimulus of an image is, remains a problem. But we must not think that images are pictures residing somewhere in the cells of the brain. An image is a mental *process*, an occurrence, and not a mental *state*. An electric current passes through a wire because of the state of the wire, its conductivity. But the current is not the state of the wire. It is a process made possible by the state of the wire. Similarly we believe that due to the occurrence of sensations the nervous substance becomes attuned and susceptible to certain particular influences. Every sensation, as we have seen, leaves traces, an "organic memory" or engram in the nervous system, and it may be these traces that form the neural basis of imagery. But we do not know the nature of the internal stimulus that excites the engram.

Dr. Russell states the difference between a percept and an image very aptly as follows:

> When a mental occurrence can be regarded as an appearance of an object external to the brain, however irregular, or even as a confused appearance of several such objects, then we may regard it as having for its stimulus the object or objects in question, or their appearances at the sense organ concerned. When, on the other hand, a mental occurrence has not sufficient connection with objects external to the brain to be regarded as an appearance of such objects, then its physical causation (if any) will have to be sought in the brain. In the former case it can be called a perception; in the latter it cannot be so called.[1]

In the latter case it is an image.

The image differs from the percept in other traits than in being centrally excited. One of these further differences is best described by William James. He says:

> I make for myself an experience of blazing fire; I place it near my body; but it does not warm me in the least. I lay a stick upon it, and the stick either burns or remains green, as I please. I call up water, and pour it on the fire, and absolutely no difference ensues. I account for all such facts by calling this whole train of experiences unreal, a mental train. Mental fire is what won't burn real sticks; mental water is what won't necessarily (though of course it may) put out even a mental fire. . . . With "real" objects, on the contrary, consequences always occur; and thus the real experiences get sifted from the mental ones, the things from our thought of them, fanciful or true, and precipitated together as the stable part of the whole experience-chaos, under the name of the physical world.[2]

In the above illustration we have a difference between imagery and perception in terms of the effects produced by

[1] RUSSELL, BERTRAND, *The Analysis of Mind*, p. 136. Copyright 1921 by The Macmillan Company; reprinted by permission.

[2] *Essays in Radical Empiricism*, Longmans, Green, 1912, pp. 32-33.

each. The image is lacking in the effects that follow a percept.

Another distinction is that a percept may be, and often is, accompanied by images, while an image can only arouse another image, but not a percept. The odor of a perfume may arouse an image of some person who uses it. The noise coming to me from the office next to mine is accompanied by an image of its occupant. The smoke outside my office window brings up an image of the shop below me. But an image of my daughter only brings other images in its train: her disordered room, her cat, her toys, her voice, etc.

III

THE NATURE OF MEMORY

The word memory is used in so many different senses that we must clear it of several meanings before we can get at its true nature. We use it most commonly in the sense of *familiarity* and *recognition*, as when, on meeting a person, we say, "I remember you." The statement, "I remember you," may involve memory; but the mere knowing a person is not memory. It is perception. Even when I am asked whether I remember so and so whom I met a month ago, and I answer in the affirmative, no memory is necessarily involved, but only recognition of the image that the name of the person evokes. And recognition, as we have already seen, may happen without consciousness of the past. The past is there as the basis of the recognition, but not the awareness of the past. Recognition depends on the past, but not on referring the present to the past. When I recognize a dog I am not thinking of the previous occasion or occasions when I met the

Memory is not recognition

animal and the conditions under which I met it. I simply recognize it as being a certain dog.

Memory is also often used to designate a verbal habit, or a habit-memory. If I can repeat a poem correctly I say that I remember it. But this is not a case of memory, but of a muscular habit. When I dive into the water and swim I do not say that I remember swimming. The repetition of the poem is altogether similar to the swimming. It is a habit. However, memory may be involved both in the swimming act and in the repetition of the poem. If, on diving into the water, things do not go well, and I try to recall what I was told to do or what I have read I should do, then memory is functioning. Likewise, if I stumble in the poem, I try to recall the exact words, and I know that I am trying to remember. But the mere repetition of a past experience is not memory. When we watch a man going through some skillful activity we never say that he remembers. The mere doing of something is not memory. However, if he were to stop suddenly and seem puzzled, we would suspect that he had forgotten something. If he then went on, we would say that he remembered. *Memory is not the doing of something muscularly, but the doing of something mentally.*

Nor is it a muscular habit

We may now turn to see what memory actually is. When I set out to learn a poem I repeat the lines until I can say them by heart. I have formed a verbal habit. The process of learning the poem is entirely like that of learning to swim. I can repeat the poem, or I may visualize it as an image, without recollecting a single event that occurred while I was learning it. But I may recollect the conditions and circumstances of my reading the poem the third time. This recollection is a quite different matter from my repeating the

poem. This *recollection is memory* in one of its forms. This illustration gives us one characteristic of memory, namely a *conscious reference of the present to the past.* If on repeating the poem I am somewhat hazy or I can't go on, I make an effort to bring back the past. Here I am not only conscious of the past, and refer the present to the past, but I am also exerting an effort to recollect it. Here we have another trait of memory, that it sometimes involves *mental effort* plus reference to the past.

It is recollection

We see, then, that recall, as a mental process beyond perception, may occur either as a reinstating of the past without conscious reference to the past, in which case we have an image; or it may occur as a reinstating of the past plus reference to the past, either as mere consciousness, or an effort to recollect the past, in which case there is memory.

A memory experience may occur as imagery, or verbal, or a mixture of the two. The image aroused by the mention of a man's name in my presence may call forth an image or images of the situation when I met him. I have a memory image of him. Or I may recollect the conversation I had with him when I first met him. My memory is verbal and no images may occur. Or the verbal and non-verbal may both be functioning in the memory. Another relationship between images and memories is that an image may be a stimulus for a memory. The mention of the man's name, instead of simply creating an image in my mind, may spontaneously evoke images of past events, or I may deliberately try to recollect the details of the last conversation I had with him. The important point to bear in mind is, however, that imagery alone is not memory. It is simply a recurrence of past percepts minus the objective stimulus. In memory there must be

awareness of a relationship between what happened in the past and what is now happening. An image, like a percept, is happening now, and involves only recognition in terms of retained past occurrences. A memory has not only recognition, but conscious reference of that which is recognized to past events connected with it, in terms of which the recognition is occurring.

Imagery is, therefore, *recognition* occurring in the absence of a physical situation, while memory is recognition *plus recollection* of the sources of the recognition. Memory is not only the functioning of past events in present happenings, but the consciousness of past events as such in their relationship to present happenings. In a word, recognition is unconscious, and when it happens without an external stimulus, we have imagery. Recollection is conscious, and whenever it happens, whether in connection with a percept or an image, we have memory.

IV

Subconscious Memories

A subconscious memory is a past experience that is not subject to voluntary recall. It is temporarily forgotten. We know that such experiences exist because they come to mind from time to time entirely unbidden and unexpected. We also know of their existence because of the rôle they play in certain functional disturbances. In such abnormalities they can be brought to consciousness only by special methods used by the psychiatrist and psychoanalyst. They manifest themselves, according to Freud and his followers, especially in dreams. They are also supposed to be the causes of what

Some experiences are not subject to normal recall

Freud calls the psychopathologies of every day, namely, slips of the tongue, sudden memory lapses, groundless fears, anxieties and premonitions.

To speak of forgotten memories sounds like a contradiction in terms, since what is forgotten is no longer a memory. It is a memory, however, because it may have all the earmarks of a conscious memory, namely, familiarity, recognition, and reference to the past, when it becomes conscious. Forgotten memories are forgotten only in the sense that they are not subject to recall at will. They come unbidden or can be recalled only under unusual conditions. This is, however, not true of all forgotten memories, for some of them are so bizarre when they appear that they resemble nothing in the past experience of the person. This is particularly true of dreams and of memories which the psychiatrist deals with, which cause such abnormalities of perception as hallucinations, obsessions, and phobias. Psychoanalysis maintains that these distortions of normal experience have a basis in the past, but that the normal experience has been suppressed because of its unpleasant nature; hence, if it does recur it does so in so disguised a form that it is unrecognizable or even unfamiliar.

Psychoanalysis recognizes three levels of memories. The highest level consists of those memories of which one is aware at a certain time. Whatever occupies one's mind at any given moment constitutes conscious memories. The second level contains all those memories of which one is not aware at any given time but of which one can become aware at will. They are within the person's beck and call. The idea that nine plus nine are eighteen is not in my mind at any particular moment, but I can bring it to mind whenever I so desire.

They constitute the subconscious

This is the co-conscious layer of memories. Below this level lie our "forgotten" experiences, or that mass of past events of which we are not aware, and which we cannot bring to consciousness at will under ordinary conditions. Hence their name, subconscious. The significant contribution of the psychoanalytic school to psychology lies not so much in recognizing the existence of a subconscious layer of mind as in pointing out its significance in human conduct, particularly as being the cause of certain kinds of abnormalities. This school insists that the subconscious exerts a controlling power upon human behavior, and since the person is not aware of its existence, he is more or less helpless before it.

Some subconscious memories are subliminal experiences

The memories that make up the subconscious are traceable to various sources. A part of the subconscious consists of subliminal experiences, or events in the life of a person which did not make a conscious impression when they occurred, but which are nevertheless retained and are revived after a lapse of time in such unusual states as "visions," hypnosis, automatic writing, dreams.

An oft-quoted case of sudden recall of subliminal impressions is given by Coleridge in his *Biographia Literaria:*

> In a Roman Catholic town in Germany, a young woman, who could neither read nor write, was seized with a fever, and was said by the priests to be possessed of a devil, because she was heard talking Latin, Greek, and Hebrew. Whole sheets of her ravings were written out, and found to consist of sentences intelligible in themselves, but having slight connection with each other. Of her Hebrew sayings, only a few could be traced to the Bible, and most seemed to be in the Rabinical dialect. All trick was out of the question; the woman was a simple creature; there was no doubt as to the fever. It was long before any explanation, save that of demoniacal possession, could be obtained. At last the mystery was

unveiled by a physician, who determined to trace back the girl's history, and who, after much trouble, discovered that at the age of nine she had been charitably taken by an old Protestant pastor, a great Hebrew scholar, in whose house she lived till his death. On further inquiry it appeared to have been the old man's custom for years to walk up and down a passage of his house into which the kitchen opened and to read to himself with a loud voice out of his books. The books were ransacked, and among them were found several of the Greek and Latin Fathers, together with a collection of Rabinical writings. In these works so many of the passages taken down at the young woman's bedside were identified that there could be no reasonable doubt as to their source.

Regarding experiences that produce no conscious impression but which are nevertheless retained and subject to recall under unusual conditions, Dr. Morton Prince writes:

It is not difficult to show that perceptions of the environment which never even entered the fringe of the personal consciousness, *i.e.*, of which the individual was never even dimly aware, may be conserved. Indeed, the demonstration of their conservation is one of the important pieces of evidence for the occurrence of co-conscious perception and, therefore, of the splitting of consciousness. Mrs. Holland, both by automatic writing and in hypnosis, describes perceptions of the environment (objects seen, etc.) of which she was not aware at the time. Miss B. and B.C.A. recall, in hypnosis and by automatic writing, paragraphs in the newspapers read through casual glances without awareness thereof. The same is true of perceptions of the environment experienced under experimental conditions as well as fortuitously. I have made a large number of experiments and other observations of this kind, and have been in the habit of demonstrating before the students at my lectures this evidence of co-conscious perception. A simple method is to ask a suitable subject to describe the dress of some person in the audience, or of objects in the environment; if he is

unable to do this, then to attempt to obtain as minute a description as possible by automatic writing or verbally after he has been hypnotized. It is often quite surprising to note with what detail the objects which almost entirely escaped conscious observation are subconsciously perceived and remembered. Sometimes the descriptions of my students have been quite embarrassing from their naïve truthfulness to nature.

The following is an example of such an observation: I asked B.C.A. (without warning and after having covered her eyes) to describe the dress of a friend who was present and with whom she had been conversing for perhaps twenty minutes. She was unable to do so beyond saying that he wore dark clothes. I then found that I myself was unable to give a more detailed description of his dress, although we had lunched and been together about two hours. B.C.A. was then asked to write a description automatically. Her hand wrote as follows (she was unaware that her hand was writing):

"He has a dark greenish-gray suit, a stripe in it—a little rough stripe; black bow-cravat; shirt with three little stripes in it; black laced shoes; false teeth; one finger gone; three buttons on his coat."

The written description was absolutely correct. The stripes in the coat were almost invisible. I had not noticed his teeth or the loss of a finger, and we had to count the buttons to make sure of their number owing to their partial concealment by the folds of the unbuttoned coat. The shoe strings I am sure, under the conditions, would have escaped nearly everyone's observation.[1]

Then we have a mass of unique mental phenomena which have no conscious cause, such as the appearance of ideas as if out of the void, flashes of genius, sudden discoveries or solutions of problems, an idea "just on the tip of the tongue" but which resists every attempt at recall, only to bob up later

[1] PRINCE, MORTON, *The Unconscious,* pp. 52-54, copyright 1914 by The Macmillan Co.; reprinted by permission.

in an unexpected manner and unbidden, slips of the tongue or pen, the sudden disappearance of a name or a number with which one is very familiar, the onset of moods, personal likes and dislikes, fears, antipathies, prejudices, all of which appear to have no rational or conscious basis, hence must be due to past happenings which have become subconscious.

A most important content of the subconscious is made up of complexes. For the nature of a complex we must quote Dr. Hart:

Let us suppose that I am an enthusiastic photographer. It is obvious that the existence of this hobby will continually affect the flow of my consciousness. Scenes which would otherwise be indifferent to me will frequently arouse interest as possible material for a picture; if I peruse a newspaper an article upon photography will at once arrest my attention, and when I meet my friends I shall probably seize every opportunity to turn the conversation to my favourite pursuit. We see, in fact, that the hobby is one of the causes determining the direction of my thinking. Now, if we endeavor to ascertain the exact nature of a hobby, we find that it is a system of connected ideas, with a strong emotional tone, and a tendency to produce actions of a certain definite character. Such a system of emotionally toned ideas is termed in technical language a "complex"—and a hobby is to be regarded as a particular variety of complex. In the simple case just described we should say that one of the causes determining the flow of my consciousness was a strong "photography complex."

Some are complexes

Complexes may be of all sorts and kinds, the component ideas may be of every variety, the accompanying emotional tones pleasant or painful, very intense or comparatively weak.

When the emotional tone of a complex is very intense, the action which it exerts upon consciousness becomes correspondingly great. Consider, for example, the immensely powerful complex formed in the young man who has recently fallen in love. Ideas belonging to the complex incessantly emerge into consciousness, the slightest

associative connections sufficing to arouse them. All his mental energy is absorbed in weaving trains of thought centered in the beloved one, and he cannot divert his mind to the business of the day. Every event which happens is brought into relation with his passion, and the whole universe is for him nothing but a setting for his dominating complex.

Complexes, then, are causes which determine the behaviour of the conscious stream, and the actions which they exert upon consciousness may be regarded as the psychological analogue of the conception of "force" in physics. They are not, of course, constantly active, but only become so under certain conditions. These conditions consist in the presence of a "stimulus," occurring whenever one or more of the ideas belonging to a complex is roused to activity, either by some external event, or by processes of association occurring within the mind itself. Thus, in the simple example we have taken, the "photography complex" might be stimulated by a conversation in which some photographic subject was introduced, or by a chain of associations leading from some indifferent idea to an idea definitely belonging to the sphere of photography. So soon as this necessary stimulation has occurred, the complex immediately tends to exert its effect upon consciousness. The effect consists normally in the introduction into consciousness of ideas, emotions, and trains of activity belonging to the complex. Of the ideas, arguments, etc., presented to the individual, those which are in harmony with the complex are reinforced, whereas those not in harmony tend to be inhibited and to lose their cogency.[1]

Some are repressions

Psychoanalysis also makes much of repressions as constituting a large part of the subconscious. A repression is the banishing of an experience from the mind due to its unpleasantness, to its incongruity with our own ideals, or its incompatibility with social demands. The experience is dismissed from the normal stock of ideas, but goes on leading an ex-

[1] HART, BERNARD, *op. cit.*, pp. 61-66; reprinted by permission of The Macmillan Company.

istence of its own in the subconscious, whence it continues to exert its influence on conscious ideas and acts. We must again quote Dr. Hart:

Let us suppose that a man has in the past done some action of which he is ashamed, so that every time the thought of this action recurs to him it occasions painful feelings of remorse. Expressing this state of affairs in our technical language, we should say that the memory of the action forms a complex which is repugnant to the personality as a whole, and that therefore a conflict is set up between the complex and the personality. Under such circumstances the individual may endeavor to rid himself of the feelings of remorse by striving to banish the painful memories from his mind, to keep them studiously out of his thoughts, and so far as possible to ignore their existence. That is to say, he may endeavor to avoid the conflict by "repressing" the offending complex, and shutting it out from the field of consciousness. This method of attaining peace of mind by refusing to acknowledge to ourselves the existence of unpleasant facts which would otherwise grievously disquiet us will be familiar to everybody. Much of the "forgetting" which occurs in our lives is not the passive process of decay which it is commonly supposed to be, but an active repression, a deliberate exclusion of the offending memory from the sphere of our consciousness.

In so far as the repression is successful the complex is dislocated from the remainder of the mind, and thrown out of gear, as it were, with the personality. It is banished from the field of consciousness, and can no longer manifest itself there in the normal manner described in Chapter V, that is to say, the complex can no longer cause the direct introduction into consciousness of the ideas, emotions, and trains of activity belonging to it.

Although the complex is thus forbidden to manifest itself in the field of consciousness, we assume, for reasons which will presently be clear, that it does not thereby cease to exist. The complex is not annihilated, but is shut out, and deprived of its normal functions.

It persists in the deeper layers of the mind, as it were, and is prevented from rising to the surface by the constant resistance which the repressive process opposes to it.[1]

V

ASSOCIATION AS A KEY TO THE SUBCONSCIOUS

Think of any word, then let your mind idle leisurely for a few minutes, and write down every word that comes to you. You will have a list of words, each of which was suggested by its predecessor but none of which you could have brought to mind alone at will. You have misplaced an article and you are looking for it. You remember that you had it when you were in this or that room. Then you begin to trace your movements from the moment you remember having had it last to the time you missed it, and then it occurs to you where you put it.

Association is free or controlled

Experience flows in a chain, each link of which suggests another link. This is known as association, or sequence, of ideas. The first instance mentioned above is a case of free association. The second is controlled association. The best example of common free association is revery and daydreaming. Ordinary thinking, working out a certain problem, answering an examination question, are instances of controlled association. As I am thinking about a certain topic there arise in my mind ideas related to it that I have picked up here and there.

What specific images and memories shall occur in the association chain is determined by past experience and present interest. Thus, the more *recently* that two ideas occurred to-

[1] *Op cit.*, pp. 91-92; reprinted by permission of The Macmillan Company.

gether, the greater the probability that the reappearance of one will recall the other. Likewise with *frequency* and *vividness*. If I think *man*, the image that will come to mind will be determined either by the man I saw most recently, or whom I see most frequently, or who made the strongest impression upon me at some time. Besides these past determinants of the sequence of ideas, there is the influence exerted by the present mental or emotional state. Any past experience which is out of harmony with my present interest is not likely to occur.

The following is an excellent illustration of a normal case of free association:

I received an hour ago (as I now write) a letter from an English friend. I had last seen him at an international conference of scholars, and instantly, as I read the letter, pictures connected with that gathering began to rise and stream. And before I knew it, as I sat for a moment thinking (if what was going on may properly be called "thought"), associated images from far and near were crowding on each other's heels. They flashed by way of a distinguished mediævalist who, as one of a hundred services, had edited "The Pearl," to the river and cliff at Durham, which I long had thought of as oddly suggestive of the etherealized landscape of that baffling poem. And with what seemed utter incongruence I instantly saw, sharp as if etched, a dark alley debauching on a river, and a policeman holding with one hand (his pistol in the other) a kicking, struggling ruffian, while a pair of sinister figures intent on rescue manœuvered for position in the background. Yet that, like the cliff at Durham, crowned with its mighty pile, was paradoxically called up by that most other-worldly of performances, "The Pearl." For the scene was an incident of the last midnight walk I had taken with a friend (now dead) who years ago had speculated brilliantly about the problem of the poem—and had been answered by the writer of my letter! Then

(although in reality the strands of recollection were simultaneously interweaving like a nest of startled snakes) with another leap of association I was on an island in the Thames, where, of a Sunday afternoon, there used to recline against a tree, like a glorious old British river-god with white and curling beard, the Chaucerian whom Chaucer would have most dearly loved. And in a twinkling the island in its turn dissolved, and the river-god became the *genius loci* of the tea shop in New Oxford Street where, in a flowing tie of unforgettable flamboyancy, he still lives in a thousand memories. And at once there slipped into the picture, displacing the glorified establishment, a dingy A.B.C. eating-house in Oldgate Street where thirty years ago delectable little lamb-pies were to be had. And off in every direction all the while were shooting other associations, recalling and linking other fleeting glimpses of yesterday, and long ago, and far away. Then the telephone incontinently cut the panorama off.[1]

They reveal the subconscious

The influence of past events and present conditions upon the flow of ideas is utilized in the practice of therapeutics, or mental healing, for running down the causes for certain functional derangements, and to detect guilt. Past events determine present attitudes. Hence, from the present attitude toward a past event the importance of the event in the life of the person may be detected. Mention some word in the presence of a person referring to some event in his life of which he is ashamed, and his reaction to the word may betray him. At least, it will be apparent that the word is significant. In seeking a clue to an abnormal symptom, the psychiatrist uses either free or controlled association. In free association the patient is given a word, or is asked to think of one, and then gives its associations. In other words,

[1] LOWES, J. L., *The Road to Xanadu,* Houghton Mifflin, 1927, pp. 429-430; reprinted by permission of and arrangement with Houghton Mifflin Company.

he is instructed to permit his ideas to wander automatically. If he stumbles over some word, or if the same word recurs a number of times, or if several of the words dwell around some one event or topic, or if he appears somewhat disturbed over some word or several words, these peculiar reactions to the word or words serve as indications that they refer to some significant event in his life which may have some connection with his ailment.

In the controlled association method a list of words is chosen, some of which are considered to be significant—that is, related to the patient's symptoms—and others insignificant. The patient is instructed to respond to each of the words with the very first word that comes to his mind. A careful record is kept of his reaction time for each word. His attitude toward each word is also carefully observed for signs of nervousness, irritability, confusion, etc. Any word which has any bearing on the patient's ailment, which suggests anything in his life that is in any way related to his symptoms, will cause some confusion, hesitation, or an attempt to repress the reaction word; and the reaction time to such words is prolonged. Hence the words that show the longest reaction time are taken as clues to the cause—some forgotten incident or incidents in past life—of the derangement. Following is an example of a word association test and its diagnosis:

STIMULUS WORD	REACTION WORD	REACTION TIME
1. Head	Hair	1.4 seconds
2. Green	Meadow	1.6
3. *Water*	*Deep*	5.0
4. Stick	Knife	1.6
5. Long	Table	1.2

STIMULUS WORD	REACTION WORD	REACTION TIME
6. *Ship*	*Sink*	3.4
7. Ask	Answer	1.6
8. Wool	Knit	1.6
9. Spiteful	Friendly	1.4
10. *Lake*	*Water*	4.0
11. Sick	Well	1.8
12. Ink	Black	1.2
13. *Swim*	*Can swim*	3.8

The patient from whom this series was obtained had, during a recent attack of depression, determined to commit suicide by drowning. This complex had manifested itself in the associations which are italicised. 3, 6, 10, and 13, are instances of increased reaction time; 13 shows also a peculiarity in the reaction word itself.[1]

VI

ABNORMALITIES OF IMAGERY AND MEMORY

Dissociation means a break in the normal even flow of ideas. Normally, mind is a unit. All ideas that make up consciousness at any interval of time are but the parts of a single thought. The normal stream of ideas is as a melody in which each tone moves toward a definite direction and fuses into the pattern of the whole. Should one tone be overstressed in the performance of the melody, there would be a distortion, the continuity would be broken. Such a break in the continuity of normal sequence of ideas, where one idea or a system of ideas (complex) assumes undue importance in the mental life of a person, is a dissociation. Dissociation does not mean a mere temporary mental diversion, a wandering of

Dissociation

[1] HART, BERNARD, *op. cit.*, pp. 69-70; reprinted by permission of The Macmillan Company.

attention from one thing to another. Such wandering is but a case of free association, and is within the person's control. In dissociation there is not merely a transition from one series of ideas to another related series, but a sudden intrusion of a completely novel series which monopolizes the attention exclusively and is beyond the control of the individual. The person does not guide the sequence or permit it to guide itself, but is ruled and controlled by it. In dissociation we have therefore a case of alteration of personality. The individual leads two unrelated lives, one characterized by the normal flow of consciousness, free or controlled, the other domineered by subconscious memories which come to the surface occasionally and take complete possession of the mind. A unique characteristic of a dissociated or split personality is that one personality does not know of the existence of the other. Dr. Jekyll and Mr. Hyde dwell in the same body but are unaware of each other. Automatic writing and somnambulism are cases of dissociation. Dreams and hypnosis are instances of partial dissociation. The various forms of insanity are all either temporary or complete dissociations.

Amnesia and hypermnesia

Other memory disorders and peculiarities beside dissociation are hypermnesia or exaggerated memory, amnesia or loss of memory. Hypermnesia may be general or specific. In general hypermnesia there is unusual recall of details of past events. This condition occurs most commonly in fever and great emotional stress. In specific hypermnesia there is unusual recall of some single event. Only few such cases are on record, as for instance the illiterate servant girl in the home of a clergyman who in a fever recited Hebrew. She had heard the words incidentally from the clergyman and they came back to her in her fever.

Forgetting

Forgetting means either failure of impression, or inability to reproduce what was once well impressed. Failure of impression may be due to various causes, such as inadequate perception, mental deficiency, dementia, or neural deterioration because of organic disease. Inability to reproduce what was once firmly impressed may be caused by disuse (fading of engram), organic deterioration as in senility, or to the conditions already discussed under the subconscious. One of the most famous instances of such forgetting is that of Irene, reported by Professor Janet:

> Irene was a girl of twenty years, who was greatly disturbed by the long illness and death of her mother. Her mother had reached the last stage of tuberculosis, and lived alone in abject poverty with her daughter, in an attic. The girl watched her mother during sixty days and nights, working at her sewing machine to earn a few pennies to sustain their lives. When finally her mother did die, Irene became very much disturbed emotionally. She tried to revive the corpse, to call the breath back again. In her attempts at placing the limbs in an upright position, the mother's body fell to the floor, whereupon she went through the strain of lifting her back into bed alone. Certainly such experiences could not be forgotten in the ordinary course of things. Yet in a little while Irene seemed to have grown forgetful of her mother's death. She would say, "I know very well my mother must be dead, since I have been told so several times, since I see her no more, and since I am in mourning; but I really feel astonished at it all. When did she die? What did she die from? Was I not by her to take care of her? There is something I do not understand. Why, loving her as I did, do I not feel more sorrow for her death? I can't grieve; I feel as if her absence was nothing to me, as if she were travelling and would soon come back." The same thing happened if you put to her questions about any of the events that happened during those two months

before her mother's death. If you asked her about the illness, the mishaps, the nightly staying up, anxieties about money, the quarrels with her drunken father,—all these things seemed to have quite vanished from her mind.

What had happened to her? Had something happened to her nervous system to wipe away all traces of the horrible events she had experienced? Was she simply pretending she did not remember? Or did she remember without being able to recall, due to some powerful inhibitions?

Some light is thrown on this question by a study of the crises (or fits) which she began to experience some time after her mother's death. These would last for hours at a time, and during them she would lose contact with her immediate surroundings and perform scenes with the skill of an actress. She would reenact all the events that took place at her mother's death, as well as other unpleasant episodes in her life, all with the greatest detail. She would carry out with words and acts the different events, and when death finally came to her mother, would prepare for her own suicide. She would discuss it aloud, seem to speak to her mother, and to receive advice from her. She fancied that she would try to be run over by a locomotive. She acted as though she were on the way, and stretched herself out on the floor of the room, waiting with dread and impatience for death to come. She posed in true dramatic style waiting for the train to come. Finally, when it came she would utter a terrible shriek, and fall back motionless as if she were dead. Then she would get up and begin acting over again one of the previous scenes. After a time the agitation seemed to die down and she came back to normal consciousness, took up her ordinary business, seemingly quite undisturbed about what had happened and with her concomitant loss of memory for the events she had so faithfully dramatized.[1]

[1] JANET PIERCE, *Major Symptoms of Hysteria,* pp. 29 and 37, copyright 1913 by The Macmillan Company; reprinted by permission.

CHAPTER XI

IMAGINATION AND REASONING

Questions this chapter seeks to answer: In what way is imagination a mental step above perception? What is creative thinking? Why is imagination always associated with genius? Why is reasoning alone ineffective in producing action in keeping with it? In what ways does the imagination evolve the new out of the old? What are the steps in the creative act? What is reasoning? What are some abnormalities of thought?

WITH imagery and memory as phases of perception behind us, we may turn to an examination of the highest form of mental activity, and therefore the most difficult topic in psychology, namely, imagination and reasoning. The difficulty arises not only because these mental processes are, in the main, the peculiar prerogative of exceptional minds, and it is difficult for us to grasp that which is somewhat beyond our own experience, but also because the ordinary usage of the terms imagination and reasoning is not only erroneous but also confusing. We pay a man a compliment when we say that he is a man of imagination, but we also doubt his soundness and even his veracity when we say that he is only using his imagination. We urge a man to use his imagination, but we also hint that his imagination is deluding him. We condemn a rumor as being merely a fig-

Popular use of terms imagination and reasoning not sound

ment of the imagination, and then praise a scientific accomplishment as being a product of great imaginative power. We also use the term imagination to designate a mere flow of imagery, which we discussed in the previous chapter as association of ideas. Imagery has a place in imagination; but free and controlled association are not imagination, but simply recall or reproduction. Imagination involves something new and novel which is an outgrowth of the old, created out of the old, and not merely the recurrence of the old.

In reasoning, similar difficulties are encountered. Ordinarily we apply the term reasoning to any mental effort we exert to express some point of view we may hold. The point of view may be utterly fallacious, and the reasons we give for holding it are mainly alleged justifications of a prejudice rather than attempts at an impersonal examination of the validity of the point of view. In other words, we do not reason, but *rationalize*. Again, when we say that a certain idea is reasonable, what we usually mean is not so much that we have examined impartially the evidences for and against the idea, but rather that it sounds plausible to us, either because it is within our understanding, or because it fits in with some of our pet notions and prejudices. Slavery was very *reasonable* to the Southerner—he even proved it by the Bible. To the plutocrat the unbalanced division of wealth is the most reasonable fact on earth, even a law of nature; but to the socialist it is not only unreasonable but a crime. Poetry is most reasonable to the poet, but it is all "moonshine" to the hard-headed business man. Whatever is beyond our understanding, or whatever runs contrary to some pet notions we hold, we usually condemn as being unreasonable. But this is not reasoning, any more than a flow of images is imagination.

I

SOME GENERAL CONSIDERATIONS

Imagination and reasoning mean creative thinking

Let us begin with a general definition. Imagination and reasoning are related mental processes that function in what we call creative thinking. To create is to reveal, to originate, to unveil, to bring into *actual* existence that which exists only *potentially*. Nature is creative in that each spring it presents to us evidences of an activity which was in progress continuously during a period when no signs of activity were evident. Whatever is present in spring, actually, was present, potentially, before spring. We therefore speak of nature as creative. Evolution is creative because new species constantly arise out of old species, which means that evolution reveals by the new actualities what the old contained in a potential, dormant state. Each living organism, from plant to man, is creative because periodically the new arises out of the old. The human mind, human intelligence, is creative because it is able so to manipulate, handle, and treat the actually existent, either as mind or matter, as to reveal that which it contains potentially. The sciences bring about new existences, either as laws, or inventions, or materials, out of existing phenomena. Philosophy begins with known ideas and uses them as a springboard into the unknown. The painter and musician use materials at hand and manipulate them so that new and unexpected forms emerge out of them. The religious genius sees the possibilities of a heaven on an earth that is apparently anything but heavenly. It visions the potentially divine and godly in actual mundane conditions.

The creative process is initiated by imagination and carried

out by reasoning. There is no reasoning without imagination, and the reasoning can be no better than the imagination on which it is based. Reasoning is a means toward an end. To reason is to think *about* something and *toward* something. The *about* is the product of imagination, the *toward* is either a faith or a belief. The religious genius has a faith in the God whom he conceived imaginatively, because of the life-transforming effect of the experience, and of whose existence he speaks in a consistent and, therefore, reasonable way. The scientific genius *believes* in a theory, which is a product of his imagination, because of the proofs—logical demonstrations—which he has deduced, but which are subject to further investigation and modification. The psychological question is, what is the nature of the processes of imagination and reasoning and what is the relationship between them?

Imagination and reasoning inseparable

Before attempting an answer to the above central question, let us call to mind some common facts which bear upon our problem, in the hope that they will give us a clue to the answer we are seeking.

As a whole, imagination is commonly considered a trait of genius. This does not mean that it is limited to genius. In various degrees it occurs in all normally constituted persons. But in genius it operates in its highest and purest form. Apparently genius can do something supremely well which the general run of human beings can do only in an imperfect manner. We owe to genius that entire structure of accumulated knowledge and its applications which we sum up in the term civilization. What is it that genius can do supremely well that the rest of us can do only imperfectly? Genius lives in the same world that all of us live in. All the phenomena of nature that are available to genius are also avail-

Imagination is a trait of genius

able to all of us. We feel that genius must be a power that can do something to these phenomena, see more in them, or see beyond them, and feel more about them, respond to them more intensively and extensively, than can other persons.

We are often told by inspirational writers and orators that genius is a power for taking pains—one per cent inspiration and ninety-nine per cent perspiration. But we know that not even one hundred per cent perspiration will make a Beethoven or a Shakespeare or a Keats. Genius labors, of course; but if labor alone made genius, the world would be oversupplied with geniuses. By labor alone no *Hamlet* or Fifth Symphony ever was or ever could be created. If one does not know where he is going, he may perspire and get somewhere, but the somewhere will be nowhere in particular. Perspiration alone never supplies a goal, although it may be required in order to reach the goal. This is obvious fact number one.

Obvious fact number two is that no amount of reasoning alone will induce in any one an experience of any real vital significance. Romeo can give no end of reasons why his Juliet is the superior of all women. But his reasons will never make any other person feel toward her as he does. The reasons he gives are not the real causes of his attitude. It is rather his attitude that gives rise to the reasons. Whatever traits Juliet possesses become significant in the light of the attitude, but the attitude is not created by the traits. We often like a person in spite of the reasons we have for disliking him and even when we have no reasons for liking him. One might, if foolish enough, venture to point out to Romeo the serious faults of his Juliet, and only succeed in making an enemy for his troubles. The faults may be valid, but they

Reasoning alone is barren

are irrelevant. When I see beauty in a painting, I may attempt to account for my experience in terms of its structural perfections, and point these out to another person who does not share my experience. He may agree with me on the technical skill of the artist and even admire the painting; but my reasons will never enable him to see the beauty I see. People agree that the Fifth Symphony is great music; they may even be able to give the reasons for its greatness which they read in a book or heard at a lecture or in the classroom, but they prefer to listen to something else. Every one agrees with the preacher on Sunday morning when he gives very good reasons for a certain line of conduct, but what happens on Monday is quite a different matter. Reason is the outer aspect of imagination, and where the outer does not have its roots in the inner it does not function. Reasons may be accepted, but they are not necessarily appropriated and assimilated.

Fact number three is that by reason alone no significantly creative work is ever produced. People take courses in how to write short stories, poetry, or plays, how to invent, etc., in which everything is arranged logically and systematically in keeping with reason; but what they produce is invariably trite and trifling. In looking at some art work we often feel that everything is well done, but that something very vital is lacking, and we say that there is no imagination in it.

Fact number four is that when we have a great, vital experience, any accounts we may give of it, no matter how detailed, systematic and logical, fall somewhat short of what we actually experienced. But the more profound the experience, the greater the urge to express it in some manner. The intensity, perseverance and impatience with which genius

pursues its objective, can never be inculcated in any one by reason alone. A prophet is not a reasonable person. If he were, he would become a priest. Beethoven was not reasonable. Had he been such, he would have written Italian operas and lived in comfort and honor. Had Bruno been reasonable he would not have died at the stake, and had Spinoza followed nothing but reason he would have joined his persecutors. The trouble with these men was that they had imagination and could not resist its driving power. By the power of imagination they saw and felt potentialities so far beyond and above the actualities that surrounded them that the vision would give them no peace until they exerted all their powers to express it in the concrete.

II

The Ways of Imagination

And now we must attempt an examination of what it is that these men and women of imagination see. There are at least six ways in which imagination works. We shall call these ways of the imagination, dissociation-association, integration, intuition, transformation, abstraction and conceptualization. These terms describe the kind of mental processes involved in the imaginative act, each process producing something new out of the old.

a.—THE PROCESS OF DISSOCIATION-ASSOCIATION

The laws of chemical combination were established by breaking up substances into their component elements, by dissociating what already was associated, which made possible an association between elements that had not been asso-

ciated, thus bringing about new substances from old ones. A new synthesis involves a previous analysis; construction is conditioned upon destruction. In the realm of mind, imagination in one of its forms works in this dissociation-association manner. A new invention is the product of seeing a novel relationship among materials that appeared to be non-related. Most of the parts that together make up a phonograph, a radio, an automobile, existed and functioned long before these products were invented. There is nothing new in the separate parts of these inventions. It is the idea that brought them together that is new, and the additional parts which the new idea made necessary. The conception of the new idea meant the breaking up of the old established associations of each part. This form of imagination is preëminently scientific, although not exclusively so. The technical triumphs of the arts, and such fantastic romances as those of Jules Verne and some of H. G. Wells, are also the products of dissociation-association. This process of breaking and building is not necessarily deliberate. The important point is that the process is one involving the directing and ordering of experience in a certain definite way and for a definite purpose, the result of which is the establishment of a relevant connection between ideas or things that are ordinarily thought of as disparate.

The emergence of the new is conditioned upon the disruption of the old

As dissociation-association, imagination is an advance and a check upon perception. In perception the tendency is to delimit and narrow experience to the point of stereotyping it. First a series of sensations become coördinated into a system as an object. Then the object gets the meaning—chair, for instance—to which is added another meaning, comfortable chair. As meanings keep on accumulating, the percept be-

comes more and more limited, narrowed, fixed and stereotyped. Unless imagination came along to counteract this stereotyping tendency of perception, mental stagnation would set in, as is the case with persons of fixed ideas. Imagination keeps percepts plastic and alive, ready for new adventures into strange realms. Because genius has this unusual power of keeping itself mentally plastic and venturing into new mental lands, it is often persecuted by those who find themselves comfortable in mental stagnation. The set, the fixed, the institutionalized, is always obnoxious to genius because it imprisons imagination in stone walls.

b.—THE PROCESS OF INTEGRATION

In integration a new unity emerges out of diversity

Coleridge gives the following account of this form of the imagination: "That synthetic and magical power, to which we have exclusively appropriated the name of imagination . . . reveals itself in the balance or reconciliation of opposite or discordant qualities . . . the sense of novelty and freshness, with old and familiar objects; . . . the power of reducing multitude into unity of effect and modifying a series of thoughts by some one predominant thought or feeling."

This process does not involve any dissociation of old experiences and ideas, but a bringing together of separate parts of experience around a central core which welds the parts into a unity and gives them, as Coleridge says, a novelty and a freshness. Coleridge's *The Ancient Mariner* is an excellent illustration of this unpremeditated gathering of materials from diverse sources, this browsing around in various mental pastures from which there at times emerges a unified product which adds another gem to the treasure chest of mankind.

"I have read almost everything," said Coleridge a year

before he wrote *The Ancient Mariner*; and Professor John Livingston Lowes tracks him through his readings in a book of 639 pages to the numerous scattered sources from which he gathered the raw materials that his imagination wove into an imperishable form. His journey took him, says Professor Lowes, "through all the lands and all the seven seas of the globe." And in his journey he met "with as strange a concourse as ever haunted the slopes of Parnassus—with alligators and albatrosses and auraras and Antichthories; with biscuit-worms, bubbles of ice, bassoons, and breezes; with candles and Cain, and the Corpo Santo; Weoclesian, king of Syria, and the dæmons of the elements; earthquakes, and the Euphrates; frost-needles, and fog-smoke, and phosphorescent light; gooseberries, and the Gardonia Casianthus; halves and hurricanes; lightnings and Laplanders; meteors, and the Old Man of the Mountain, and stars behind the moon; nightmares, and the sources of the Nile footless birds of Paradise, and the observatory at Pekin; swoons, and spectres, and slimy seas; wefts, and water-snakes, and the Wandering Jew."

Out of the heart of this chaos sprang *The Ancient Mariner* and *Kubla Khan*. These products are the result of an unconscious selection of the relevant and a discarding of the irrelevant, a process of mental assimilation and rejection. What the outcome of this browsing and brooding may be, the creative mind is seldom aware; but suddenly, as if out of thin air, an idea appears which rallies around it this welter of disconnected experiences and molds them into a single novel entity. We find this form of imagination at work in the realm of epic and narrative poetry, in realistic drama and fiction. The incidents, characters and situations, which together make

up a play or a novel, have been gathered accidentally and incidentally from numerous sources, without any conscious purpose. But they become stored up as raw materials ready for future use in an auspicious moment when the fires of imagination will fuse them into a work of art.

Milton kept a Commonplace Book of extracts culled from his readings. Shelley's note books are written upside down, sidewise, right side up, with scribbled marginal sketches of boats and trees and human faces. According to Professor Lowes,

> Coleridge's Note Book is a catch-all for suggestions jotted down chaotically from Coleridge's absorbing adventures among books. It is a repository of waifs and strays of verse, some destined to find a lodgment later in the poems, others yet lying abandoned where they fell, like drifted leaves. It is a mirror of the fitful and kaleidoscopic moods, and a record of the germinal ideas of one of the most gifted and utterly incalculable spirits ever let loose upon the planet. And it is like nothing else in the world so much as a jungle, illuminated eerily with patches of phosphorescent light, and peopled with uncanny life and strange exotic flowers. But it is teeming and fecund soil, and out of it later rose, like exhalations, gleaming and aerial shapes.[1]

From thus surprising the imagination at work in Coleridge, Professor Lowes concludes:

> Every great imaginative conception is a vortex into which everything under the sun may be swept. "All other men's worlds," wrote Coleridge once, "are the poet's chaos." In that regard "The Ancient Mariner" is one with the noble army of imaginative masterpieces of all time. Oral traditions—homely, fantastic, barbaric, disconnected—which had ebbed and flowed across the planet

[1] LOWES, JOHN L., *op. cit.*, p. 6; reprinted by permission of and arrangement with Houghton Mifflin Company.

in its unlettered days, were gathered up into that marvel of constructive genius, the plot of the *Odyssey*, and out of "a tissue of old *marchen*" was fashioned a unity palpable as flesh and blood and universal as the sea itself. Well nigh all the encyclopedic erudition of the Middle Ages was forged and welded, in the white heat of an indomitable will, into the steel-knit structure of the *Divine Comedy*. There are not in the world, I suppose, more appalling masses of raw fact than would stare us in the face could we once, through some super-subtle chemistry, resolve that superb, organic unity into its primal elements.[1]

C.—THE PROCESS OF INTUITION

The best account of this form of imagination is given by the French philosopher, Henri Bergson. He writes:

Consider, again, a character whose adventures are related to me in a novel. The author may multiply the traits of his hero's character, may make him speak and act as much as he pleases, but all this can never be equivalent to the simple and indivisible feeling which I should experience if I were able for an instant to identify myself with the person of the hero himself. Out of that indivisible feeling, as from a spring, all the words, gestures, and actions of the man would appear to me to flow naturally. They would no longer be accidents which, added to the idea I had already formed of the character, continually enriched that idea, without ever completing it. The character would be given to me all at once, in its entirety, and the thousand incidents which manifest it, instead of adding themselves to the idea and so enriching it, would seem to me, on the contrary, to detach themselves from it, without, however, exhausting it or impoverishing its essence. All the things I am told about the man provide me with so many points of view from which I can observe him. All the traits which describe him, and which can make him known to me only by so many comparisons with persons or things I know

Intuition is penetration beyond surface

[1] LOWES, JOHN L., p. 426.

already, are signs by which he is expressed more or less symbolically. Symbols and points of view, therefore, place me outside him; they give me only what he has in common with others, and not what belongs to him and to him alone. But that which is properly himself, that which constitutes his essence, cannot be perceived from without, being internal by definition, nor be expressed by symbols, being incommensurable with everything else. Description, history, and analysis leave me here in the relative. Coincidence with the person himself would alone give me the absolute.[1]

By the power of intuition mind penetrates beyond the parts to the core, of which the parts are the manifestations. Through insight apparent diversity is resolved into fundamental unity. In the light of this unity the diverse obvious parts assume an altogether new and vital significance. The whole, the unity, is always more than the sum total of its parts. The whole has properties which emerge out of the parts, but which are not present in each of the parts. To know the parts is only to see the whole in the raw, and not as it actually is in all its uniqueness and distinctiveness. I cannot make any one see what I see in such an experience as beauty, since my account only points out the parts and not the whole which makes the parts significant to me. A gesture, a word, a movement of a loved person, throws the lover into ecstasy because it is to him an external, partial manifestation of the total personality he adores. To him who does not feel the personality, the gesture is no more significant than is that of any other Jack or Jill. Unless this underlying unity is directly and immediately experienced, no inventory of its parts by a logical procedure will lead to it. This direct, immediate penetration beyond the parts to the unity is intuition.

[1] *An Introduction to Metaphysics,* Putnam, 1912, pp. 3-5.

The parts are the gateways to the unity, since they are the external and manifest evidences of its existence, but they are not the unity. But by a patient and persistent loitering around the gateways one may hope to catch a glimpse beyond them, and even gain admittance to the promised land. This is the story behind the great scientific and philosophical generalization; and of such a nature is the conception of God in the prophets, saints and mystics.

d.—THE PROCESS OF TRANSFORMATION

Transformation is an imaginative flight from reality

This process is in evidence in highly fantastic works of fiction, poetry and drama, such as *Through the Looking Glass, Alice's Adventures in Wonderland*, the works of Cabell, the plays of Maeterlinck, mythology, fairy tales, etc. In these works the facts of everyday existence are utilized as the materials for fiction; a new world of mind is constructed out of the old world of matter, which affords a respite and a rest from the weariness and tumults of daily existence. The desire for escape from the tyranny and oppression of life's everyday affairs and trials is one of the least recognized and yet one of the most intense of human cravings. To this craving is due the popularity of stories of adventure of the *Robinson Crusoe* type, romances in which life appears as perfect and harmonious, tales of supermen and superwomen, stories dealing with life in distant lands and primitive life, and the description of perfect social orders. Then there is the appeal of secret societies with mysterious names and esoteric rituals, masquerades where the individual is transformed into an emperor, outlaw, or anything that he is not, parades in full regalia of feathered hat and swinging sword.

In poetry and literature in general we find numerous vigorous protests against the burden and encumbrances of existence. Wordsworth cries:

> The world is too much with us; late and soon,
> Getting and spending, we lay waste our powers;
> Little we see in Nature that is ours;
> We have given our hearts away, a sordid boon!
> This Sea that bares her bosom to the moon;
> The winds that will be howling at all hours,
> And are up-gathered now like sleeping flowers;
> For this, for everything, we are out of tune;
> It moves us not.—Great God! I'd rather be
> A Pagan suckled in a creed outworn;
> So might I, standing on this pleasant lea,
> Have glimpses that would make me less forlorn;
> Have sight of Proteus rising from the sea;
> Or hear old Triton blow his wreathèd horn.

How does the imagination transform reality? It does so in a number of ways.

First, it denies the reality of the apparently real, the obvious, the concrete, and affirms the reality of the elusively unreal. When the poet proclaims the existence

> Of armies without a country
> Storming a nameless gate
> Hurling terrible javelins down
> From the shouting wall of a singing town
> Where no women wait.

a world is created which has its foundation in realities—armies, countries, gates, waiting women; but from these realities everything is removed that marks them in actuality. The reality of the fact is denied and the reality of the fiction is affirmed.

Second, it denies the reality of the useful, the practical, and affirms the reality of the useless and unpractical. Keats sings that:

> Spite of despondence, of the inhuman dearth
> Of noble natures, of the gloomy days,
> Of all the unhealthy and o'er-darkened ways
> Made for our searching: yes, in spite of all,
> Some shape of beauty moves away the pall
> From our dark spirits. Such the sun, the moon,
> Trees old and young, sprouting a shady boon
> For simple sheep; and such are daffodils
> With the green world they live in; and clear rills
> That for themselves a cooling covert make
> 'Gainst the hot season; the mid-forest brake,
> Rich with a sprinkling of fair musk rose blooms:

Third, by imagination the fleeting and the transitory become the permanent, and the insignificant and commonplace become the unique. J. M. Barrie writes:[1]

How comely a thing is affliction borne cheerfully, which is not beyond the reach of the humblest of us. What is beauty? It is these hard-bitten men singing courage to you from their tent; it is the waves of their island home crooning of their deeds to you who are to follow them. Sometimes beauty boils over and then spirits are abroad. Ages may pass as we look or listen, for time is annihilated. There is a very old legend told to me by Nansen, the explorer—I like well to be in the company of explorers—the legend of a monk who had wandered into the fields and a lark began to sing. He had never heard a lark before, and he stood there entranced until the bird and its song had become a part of the heavens. Then he went back to the monastery and found there a doorkeeper whom he did not know and who did not know him. Other monks came, and they were all strangers

[1] *Courage, Scribner's,* 1922, pp. 33-34.

to him. He told them he was Anselm, but that was no help. Finally they looked through the books of the monastery, and these revealed there had been a Father Anselm there a hundred or more years before. Time had been blotted out while he listened to the lark.

The process of transformation is imagination's bold effort to escape the moving present, with its conflicts, its problems, its passions, rivalries, victories and defeats. In that masterful novel, *Jean Christophe,* the author, Romain Rolland, writes of music, the most imaginative of the arts:

Life passes. Body and soul flow onward like a stream. The years are written in the flesh of the ageing tree. The whole visible world of form is forever wearing out and springing to new life. Thou only dost not pass, immortal music. Thou art the inward sea. Thou art the profound depths of the soul. In thy clear eyes the scowling face of life is not mirrored. Far, far from thee, like the herded cloud, flies the procession of days burning, icy, feverish, driven by uneasiness, huddling, moving on, on, never for one moment to endure. Thou art a whole world to thyself. Thou hast thy sun, thy laws, thy ebb and flow. Thou hast the peace of the stars in the great spaces of the field of night, marking their luminous track-plows of silver guided by the sure hand of the invisible ox-herd.

Music, serene music, how sweet is thy moony light to eyes wearied of the harsh brilliance of this world's sun! The soul that has lived and turned away from the common horse-pond, where, as they drink, men stir up the mud with their feet, nestles to thy bosom, and from thy breasts suckled with the clear running waters of dreams. Music, thou virgin mother, who in thy immaculate womb bearest the fruit of all passions, who in the lake of thy eyes, whereof the color is as the color of the rushes, or as the pale green glacier water, enfoldest good and evil, thou art beyond evil, thou art beyond good; he that taketh refuge with thee is raised above the passing time; the succession of days

will be but one day, and death that devours everything on such an one will never close its jaws.[1]

c.—THE PROCESS OF ABSTRACTION

In ordinary experience, in perception, our principal interest is not in what we get directly and immediately as sensations, but in the interpretation, the meaning we impose upon what comes to us directly. We are not interested in pure form, or pure, unadorned experience, but in the trappings of experience, in what the form means as fact and value. It is not the substance, the essence of experience that concerns us in perception, but the attributes we impose upon the essence. In perception we act upon things, speculate about them, feel about them, but do not contemplate them for what they are ultimately in themselves as forms. We do not accept things as things, permit them to produce their own unadorned, naked effect upon us, but we act upon them: what they are, what they are good for, and how good they are. We extract ideas from them and exercise our will upon them. But the creative mind is capable of stripping experience of its practical accouterments, of its attributes, of what mind has imposed upon them as meanings, so that nothing is present but pure form, the thing as it is in itself, naked, unadorned appearance. This is predominantly the mind of the artist, the æsthetic attitude toward the world.

In abstraction experience is divested of practical implications

The world is observed minus will and minus idea. Objects are experienced in a state of pure perception. The whole universe is an appearance with which to become identified. There is no desire to understand, only to experience directly and immediately. The world presents itself as a relationship of

[1] Published by Henry Holt and Co., pp. 349-350.

motions, vital energies, sounds, lights. These are not explained, only experienced. The genius here is the person who can detach himself from practical considerations and implications, who can divest percepts of that which makes them such, and whose attitude toward the world is a disinterested one. This naked, outer world can stir in him great depths of feeling of which the practical mind knows naught. It can stir more deeply than any scientific discovery, political upheaval or social disaster. And it can experience form in everything within experience. There is beauty everywhere and in everything, provided the practical trappings of experience are eliminated and pure form comes to the fore.

When we look at a great portrait or witness a great play or read a great novel, it never occurs to us to inquire as to whether the characters, the incidents, the events we are witnessing have ever occurred or not. The mere facts and values that occupy and monopolize our attention in daily affairs are here of no importance whatever. We are not interested in attributes of experience, in judging, evaluating, but only in what comes to us as pure essence, pure experience, pure form. But this pure, significant, affectively toned form exists only for him who created it, who has cleansed the experience of all non-essential vestments. It is therefore a creation, a new mental structure, a product of imagination.

f.—THE PROCESS OF CONCEPTUALIZATION

The human mind knows not only "a man," but also "man" —not only a particular, definite, specific percept known as Jones or Smith, but also a symbolic, general, abstract concept that stands for and includes all Joneses and all Smiths.

How is the general idea "man" evolved from any particular

"a man"? A percept is a particular qualified something, its particularity arising from the qualities and attributes imposed upon it by the mind in its attempt to fit the new impression into the mold of old experience. The percept "John Smith" includes all those characteristics that distinguish John Smith from non-human animals as well as the traits that mark him off as an individuality differing from all others of his kind. If we divest John Smith of all those attributes that make him one particular sort of person, such as a certain kind of appearance, mannerisms, temperament, interests, profession, social position, family connections, and so forth, he is no longer John Smith, but "a man"—that is, "any man." Even as "a man," however, he is still concrete and particular, and therefore somewhat limited in scope, although not as limited as when he is John Smith. To become limitless and definite, he must be rid of other attributes—attributes which are even more closely part of him than those that he possesses as John Smith. Thus he possesses legs, arms, mouth, eyes, hair and body, and as "a man," his legs are of a certain length, his eyes and hair of a certain color, and his body of a certain size and shape. In other words, a *particular* man possesses not only essential features, such as legs, arms, body, mouth, nose, eyes, hair and head, but these features are also qualified as being of a certain particular kind in color, size and shape. But a leg of a particular size, or an eye of a particular color, is not indispensable for "a man" to be "man." That is, although a leg is always of a particular size, and an eye is always of a particular color, nevertheless what distinguishes basically the human being from other forms of life, in so far as general appearance is concerned, is not the size, shape and color of these or other organs, but these

organs themselves, without which human beings would not be what they are.

Consequently, when "a man" becomes "man," what has happened is that not only has John Smith the percept, the particular man, been divested of all those deliminating qualities that label him as being John Smith, but even after John Smith has become "a man" he is further stripped of those other attributes that make him "a man," until only that is left of him which constitutes the substance "man" in general. Through this process of stripping and divesting the qualified John Smith, and the less qualified "a man," both John Smith and "a man" have become the unlimited "man." Thus the single has become a type, the particular has been turned into the general, the finite has become the infinite: John Smith has come to represent the entire human family, mankind.

Now this stripping and divesting takes place only in mind. It is a purely imaginative process. By the power of imagination, fact is turned into idea, the concrete into the abstract, the particular into the general. Imagination builds up an inner world which exists apart, although it is derived from the outer world. It is the imagination that enables man

> To see a World in a grain of sand,
> And a Heaven in a wild flower,
> Hold Infinity in the palm of your hand,
> And Eternity in an hour.

III

THE CREATIVE PROCESS

We have thus far considered only the product of imagination, the fruit of the creative process, but not the process itself.

To the creative mind this product seems to come in a flash, as a sudden revelation, in the form of an inspiration. "My conceptions," wrote Remy de Goncourt, "rise into the field of consciousness like a flash of lightning or the flight of a bird." But this suddenness is deceptive. The new product is the outgrowth of much searching, turmoil, labor and effort, not necessarily premeditated and deliberate, but nevertheless a slow, gradual development. Thought always precedes art. Art is the doing of something, the manipulating of certain materials in a certain skillful way for a certain purpose. The purpose is the fruition of a thought process. The gestures, facial expressions, vocal intonations that constitute the actor's part in portraying a rôle, arise from his conception of the character he is to present. The scientist builds his apparatus in keeping with the theory he has evolved which he wants to test out. The way the painter handles his colors and the composer his tones is not accidental but ordered, in keeping with that which he desires to objectify. The demonstration in science and the objectification in the arts are means toward an end. But the end is the product of the creative process, of thought, whether conscious or unconscious.

Creativeness is not a "flash"

Several creative minds with a bent for introspection have left accounts of how their creative ideas came to them. These accounts are probably over-simplified. But they serve the purpose of giving us a hint as to what is going on. We may well take one of these and attempt to analyze out the stages in the process.

It is time to penetrate deeper and to see what goes on in the very soul of the mathematician. For this, I believe, I can do best by recalling memories of my own. But I shall limit myself to telling how I wrote my first memoir on Fuchsian functions. I beg

the reader's pardon; I am about to use some technical expressions, but they need not frighten him, for he is not obliged to understand them. I shall say, for example, that I have found the demonstration of such a theorem under such circumstances. This theorem will have a barbarous name, unfamiliar to many, but that is unimportant; what is of interest for the psychologist is not the theorem but the circumstances.

For fifteen days I strove to prove that there could not be any functions like those I have since called Fuchsian functions. I was then very ignorant; every day I seated myself at my work table, stayed an hour or two, tried a great number of combinations and reached no results. One evening, contrary to my custom, I drank black coffee and could not sleep. Ideas rose in crowds; I felt them collide until pairs interlocked, so to speak, making a stable combination. By the next morning I had established the existence of a class of Fuchsian functions, those which come from the hypergeometric series; I had only to write out the results, which took but a few hours.

Then I wanted to represent these functions by the quotient of two series; this idea was perfectly conscious and deliberate, the analogy with elliptic functions guided me. I asked myself what properties these series must have if they existed, and I succeeded without difficulty in forming the series I have called theta-Fuchsian.

Just at this time I left Caen, where I was then living, to go on a geologic excursion under the auspices of the school of mines. The changes of travel made me forget my mathematical work. Having reached Coutances, we entered an omnibus to go some place or other. At the moment when I put my foot on the step the idea came to me, without anything in my formed thoughts seeming to have paved the way for it, that the transformations I had used to define the Fuchsian functions were identical with those of non-Euclidean geometry. I did not verify the idea; I should not have had time, as upon taking my seat in the omnibus I went on with a conversation already commenced, but I felt a

perfect certainty. On my return to Caen, for conscience's sake I verified the result at my leisure.

Then I turned my attention to the study of some arithmetical question, apparently without much success and without a suspicion of any connection with my preceding researches. Disgusted with my failure, I went to spend a few days at the seaside and thought of something else. One morning, walking on the bluff, the idea came to me, with just the same characteristics of brevity, suddenness and immediate certainty, that the arithmetic transformations of indeterminate ternary quadratic forms were identical with those of non-Euclidean geometry.

I returned to Caen, I meditated on this result and deduced the consequences. The example of quadratic forms showed me that there were Fuchsian groups other than those corresponding to the hypergeometric series; I saw that I could apply to them the theory of theta-Fuchsian series and that consequently there existed Fuchsian functions other than those from the hypergeometric series, the ones I then knew. Naturally I set myself to form all these functions. I made a systematic attack upon them and carried all the outworks, one after another. There was one, however, that still held out, whose fall would involve that of the whole place. But all my efforts only served at first the better to show me the difficulty, which indeed was something. All this work was perfectly conscious.

Thereupon I left for Mont-Valerien, where I was to go through my military service; so I was very differently occupied. One day, going along the street, the solution of the difficulty which had stopped me suddenly appeared to me. I did not try to go deep into it immediately, and only after my service did I again take up the question. I had all the elements and had only to arrange them and put them together. So I wrote out my final memoir at a single stroke and without difficulty.[1]

In this account we can recognize at least four stages: a

[1] POINCARÉ, H., *Foundation of Science,* The Science Press, 1913, pp. 387-388.

stage of preparation, of incubation, of illumination or inspiration or revelation, and a stage of verification.

a.—THE PERIOD OF PREPARATION

In preparation there is a general search, studied or unstudied, a general adventuring around a promised land, a groping for something that is still hidden but for which there is a feeling of premonition, a gathering of materials, of odds and ends, a skirmishing about prompted by a drive for something the nature of which is yet but vaguely present. Coleridge's wide reading represents a stage of preparation. In Beethoven's note books there are numerous forms of the theme of the andante movement of the Fifth Symphony.

In preparation the soil is prepared and seed planted

Preparation may proceed by regulated thought, a deliberate seeking, as that of Poincaré, and of most scientific work; or in scattered ranging of the mind, as in Coleridge and in most literary work. In regulated thought the mind covers a certain intellectual area within which an answer to the problem may be found, like one sweeping a room in order to find a lost jewel. In non-regulated preparation the mind simply wanders, like the bear who went over the mountain just "to see what he could see," gathering up treasures on earth to use in the heaven of imagination. The mind buzzes about like the bee, gathering honey where it may. Preparation in deliberate thought is a process of trial and error rather than of confusion. The thinker follows up a certain clue until he is quite sure he is on the wrong track, and then starts out anew until he comes up against another *impasse*. "Truth," said Bacon, "comes out of error much more rapidly than it comes out of confusion. If you go buzzing about between right and wrong, vibrating and fluctuating, you come out

nowhere; but if you are absolutely and thoroughly and persistently wrong you must some of these days have the extreme good fortune of knocking your head against a fact, and that sets you all right again." This is the preparation period in science.

In literature and art it is more of the nature of a leisurely strolling about wherever inclination may lead. There is nothing in particular that is being sought, but by chance something of unusual significance may be found. There need be no conscious goal in artistic preparation, but a playful maneuvering which becomes focused only as the creative unfolding nears completion. The following accounts from artists show this period at work in its manifold forms:

Schiller wrote to Goethe:

> In spite of our boasted independence, we are slaves to nature, and our will is helpless when nature says nay. What I have been brooding over in vain for five weeks came to me as in a flash within three days, although my persistence may have paved the way for the solution; but it is only the solution that has warmed me. To this Goethe replied: We can do nothing but pile up the wood and let it dry; it will catch fire in due time, and we wonder over the occurrence.

Pietzsch writes as follows about Turgenev's manner of work:

> His mode of poetic production was most unique. A scene, a group, which he had once seen, would suddenly well up in his mind. Around it there gathered, as if out of an illumined mist in ever greater clarity, numerous other images. He recognized these with complete certainty in all their natural detail, their form, movement. He spoke their language and heard their voices. They told him their story.

The painter Richter writes:

As twilight set in and I put the book away and approached the blind shutters of the windows, a composition arose before me about which I had not the slightest thought, complete and ready, alive in form and color, that I, enthralled, quickly seized charcoal, and in spite of approaching darkness, made a complete sketch on canvas.

Schindler relates of Beethoven:

These moments of sudden inspiration often came upon him when present at lively social functions, but also in the street, and so that passers-by would gaze at him in astonishment. What was going on in his mind was visible in his shining eyes and glowing face, but he never gesticulated with either hands or head.

The dramatist Grillparzer relates:

At this time I planned to take advantage of a vacation to finish my play, "The Golden Fleece," work on which was interrupted by my Italian journey. But a tragic event intervened. My mother's death, the overwhelming impressions of the Italian journey, my sickness in Italy, the distractions of the return home, had effaced all preparation for the work I planned. I had forgotten everything. Above all, the point of view, but also the details, were cast into darkness, so that I could never decide to put anything on paper. While I was attempting vainly to delve into my memory, something wonderful occurred. I used to play with my mother the compositions of great masters arranged for the piano for four hands. While playing the symphonies of Haydn, Mozart, Beethoven, I thought continually about my "Golden Fleece," and the embryonic ideas fused with the tones into a unified whole. This fact I had also forgotten or never thought of seeking help thereby. I had made the acquaintance of Karoline Pickler, an authoress. Her daughter was a pianist and at times we would play the piano after dinner. Then it happened that when we came to the symphonies that I had played with my mother all my former ideas

came back to me. I knew once more what I needed,—and although the same standpoint could not be regained, my purpose and the tendency of the entire play became clarified. I set to work, finished the Argonauts and began Medea.

b.—THE PERIOD OF INCUBATION

To the creative mind the skirmishing about in the period of preparation often appears fruitless. But it supplies the raw material for the next period, that of incubation. Preparation supplies and plants the seed that germinates in the soil of incubation. The mental processes in incubation are always unconscious. Consciously attention may be on something else, or there may be total abstention from all conscious mental effort. Incubation is a stage of unconscious elaboration. It is the winter and early spring of thought, when on the surface there is no evidence of the great activity going on within. The creative worker seems to enjoy a period of idleness and fruitlessness. But it is the calm before the storm, the gathering of the clouds that will break out in the storm of inspiration. Poincaré writes of this period:

In incubation the seed of preparation germinates

Most striking at first is this appearance of a sudden illumination, a manifest sign of long, unconscious prior work. The rôle of this unconscious work in mathematical invention appears to me incontestable, and traces of it would be found in other cases where it is less evident. Often when one works at a hard question, nothing good is accomplished at the first attack. Then one takes a rest, longer or shorter, and sits down anew to the work. During the first half-hour, as before, nothing is found, and then all of a sudden the decisive idea presents itself to the mind. It might be said that the conscious work has been more fruitful because it has been interrupted and the rest has given back to the mind its force and freshness. But it is more probable that this rest has been filled out with unconscious work and that the

result of this work has afterward revealed itself to the geometer just as in the cases I have cited; only the revelation, instead of coming during a walk or a journey, has happened during a period of conscious work, but independently of this work which plays at most a rôle of excitant, as if it were the goad stimulating the results already reached during rest, but remaining unconscious to assume the conscious form.

There is another remark to be made about the conditions of this unconscious work: it is possible, and of a certainty it is only fruitful, if it is on the one hand preceded and on the other hand followed by a period of conscious work. These sudden inspirations (and the examples already cited sufficiently prove this) never happen except after some days of voluntary effort which has appeared absolutely fruitless and whence nothing good seems to have come, where the way taken seems totally astray. These efforts then have not been as sterile as one thinks; they have set agoing the unconscious machine, and without them it would not have moved and would have produced nothing.

The need for the second period of conscious work, after the inspiration, is still easier to understand. It is necessary to put in shape the results of this inspiration, to deduce from them the immediate consequences, to arrange them, to word the demonstrations, but above all is verification necessary. I have spoken of the feeling of absolute certitude accompanying the inspiration; in the cases cited this feeling was no deceiver, nor is it usually. But do not think this a rule without exception; often this feeling deceives us without being any the less vivid, and we only find it out when we seek to put on foot the demonstration. I have especially noticed this fact in regard to ideas coming to me in the morning or evening in bed while in a semi-hypnagogic state.

Such are the realities; now for the thoughts they force upon us. The unconscious, or, as we say, the sublimal self plays an important rôle in mathematical creation; this follows from what we have said. But usually the sublimal self is considered as purely automatic. Now we have seen that mathematical work is not simply mechanical, that it could not be done by machine, however per-

fect. It is not merely a question of applying rules, of making the most combinations possible according to certain fixed laws. The combinations so obtained would be exceedingly numerous, useless and cumbersome. The true work of the inventor consists in choosing among these combinations so as to eliminate the useless ones or rather to avoid the trouble of making them, and the rules which must guide this choice are extremely fine and delicate. It is almost impossible to state them precisely; they are felt rather than formulated. Under these conditions, how imagine a sieve capable of applying them mechanically?[1]

C.—THE PERIOD OF INSPIRATION

Inspiration has three characteristics: (1) a sudden flash of illumination or divination, (2) an unusual emotional state, and (3) an unearthly impersonal appearance.

The flashlike aspect of inspiration is due to the fact that it is the culmination of the unconscious process of incubation. It therefore appears as something new, unexpected, a revelation. But it is the effect of a cause, the blossom of the tree of incubation and the roots of preparation. The full-flowering of inspiration is often accompanied or, rather, heralded, by an intimation, a dim, faint, strange feeling, a premonition, when the new idea enters the first stages of birth, appears in what we may call the "fringe of consciousness." This intimation makes itself evident in a feeling of restlessness, uncertainty, a groping for something vaguely sensed, elusive, but felt to be tremendously significant. The solution of the problem is felt to be on the way, although what it is to be is not as yet known. Any attempt to force it to the fore only succeeds in driving it back to its lair. It must be permitted to abide its own time and to come to the front whenever it will.

In inspiration the seed reaches fruition

[1] *Op. cit.*, pp. 389-390.

These dawnings are the "airy nothings," the "shapes of things unknown," of which Shakespeare speaks in describing the poet's work, which the "imagination bodies forth" and which when fully born are turned to shapes and given "a local habitation and a name." When intimation becomes certainty, there is a welling up of feeling which may attain to transport or even delirium. The phase of impersonality in inspiration is similar to the mystical experience in religion. The person appears to be seized by some power coming from the outside, a power which is unearthly and which transcends all earthly experience. "Every product of higher art," wrote Goethe, "every significant *aperçu*, every thought, which yields fruit, lies in no man's control, but is raised above all earthly power. The man is controlled by a demon while he believes that he is directing his own activities. In such instances a man is a tool of a higher ruling power, a favored receptacle of divine influences." Psychologically this impersonal phase of inspiration is due to three causes: (1) an alteration of normal self-consciousness which has occurred because of the unusual emotional state, so that the self seems to extend beyond its normal confines, to rise out of itself; (2) the displacement of the normal active state by a passive, contemplative condition, and (3) the appearance of novelty that characterizes the mental content of the experience and therefore is felt to come from a source other than the normal self whose experiences always bear the mark of familiarity.

d.—THE PERIOD OF VERIFICATION: REASONING

To reason is to inquire of oneself. The inquiry is set up by something, proceeds in a certain way, and has a certain purpose. In other words, we reason about something because

we want to get somewhere mentally; and in order to get somewhere, and not anywhere, the mental process must be controlled and directed by the goal to be attained.

In creative thinking, the *something* about which the reasoning is done is supplied by imagination. Reasoning is therefore an extension or a prolongation of the period of inspiration, the calm after the storm, and consists of a cool, sober deliberation on the product yielded in inspiration. "It never happens," writes Poincaré, "that unconscious work supplies *ready-made* the result of a lengthy calculation in which we have only to supply fixed rules. . . . All that we can hope from these inspirations, which are the fruits of unconscious work, is to obtain points for such calculations. As for the calculations themselves, they must be made in the second period of conscious work which follows the inspiration, and in which the results of the inspiration are verified and the consequences deduced. The rules of these calculations are strict and complicated, and they demand discipline, attention, will, and consequently, consciousness. . . ." Reasoning is thus an outgrowth of imagination, a mental process aroused by imagination and ordered and controlled by it as a means toward an end. The reasoning therefore cannot be any better than the imagination which initiates it. By what appears to be reason it is possible to demonstrate anything, even that reason is unreasonable. It is a common practice to glorify reason, the rational at the expense of the non-rational. But the fact is that the two are inseparable or, rather, that when the rational is dissociated from the non-rational, the result is an abortion and a distortion of thought. The purely imaginative process from preparation to inspiration is non-rational. But it supplies the spur, the motive, for the rational. And the

Verification is the period of completion

more vivid the imagination, the clearer and more convincing is its rational objectification. The very foundation of thought is non-rational. To think is to think about *something*. The *something* is the given, and the given is always non-rational. For instance, the chemist thinks about the constitution of matter. His thinking consists of breaking up a substance into its elements and deducing therefrom laws of atomic combination. In analyzing matter and deducing its laws he follows a rigid systematic reasoning process. But the beginning of his reasoning process, the unit substance he is dealing with, is non-rational. He finds, by his reasoning, that salt is sodium and chlorine in certain atomic proportions. But why sodium and chlorine in certain proportions should combine to form salt whose properties are altogether different from those of its constituent elements, is non-rational; there simply is no reason. It is so just because it is so, and that's the end of it. Whoever cannot see imaginatively cannot think rationally, since he has nothing to think about or think toward.

IV

THE REASONING PROCESS

The various senses of thought

The classical account of the reasoning process is given by John Dewey in his book, *How We Think*. Dewey discusses four senses in which the word thought is used, only one of which he recognizes as true thinking. When something just "goes through our head" we dignify the event by calling it a thought, which it is not. It may simply be a train of images or memories. Simply to be conscious is not to think. It is more often to feel. When some proposition is presented to us and we say that we will think about it, what we most often do is

feel about it. A more limited sense of thought refers to having in mind only that which is not present to a sense organ, that which is not directly seen, heard, smelled or tasted. A still more restricted meaning of the term is a belief based upon a study of all available facts bearing upon a problem. This is true, reflective thinking. In reflective thought there is not only a sequence of ideas but a "consequence—a consecutive ordering in such a way that each determines the next as its proper outcome, while each in turn leans back on its predecessors. The successive portions of the reflective thought grow out of one another and support one another; they do not come and go in a medley. Each phase is a step from something to something—technically speaking, it is a term of thought. Each term leaves a deposit which is utilized in the next term. The stream or flow becomes a train, chain, or thread."[1] Such thinking is not restricted to that which is beyond direct observation, and aims at knowledge. It has for its purpose the demonstration of something, either the grounds for a belief, or an examination of the grounds for the belief. Thought Dewey defines as *"active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends. . . ."*[2] It is directed and controlled conscious mental effort, similar to the physical effort we found in voluntary action.

Thinking is initiated by the existence of a doubt, uncertainty, a forked-road situation, the coming up against a dilemma, the presence of alternative possibilities for the reaching of a desired goal. The desired goal is the steadying factor

[1] DEWEY, JOHN, *How We Think,* D. C. Heath, 1910, pp. 2-3.
[2] *Ibid.,* p. 6.

To think is to direct ideas toward a definite goal

of thinking, keeping the mind from wandering off into mental by-paths, and calling for a testing out of every step taken forward. There may be a great deal of exploring and adventuring into by-paths, but the main road is always kept within view. The reasoning process is a mental exploration, a mental searching for ways and means in which each step is guided and prompted by the end to be accomplished. The end is one of two kinds. In science and philosophy the end of the reasoning is to verify, to give the grounds for a belief, a theory. A theory is a conjecture, a suggestion, calling for evidences which either corroborate it or cause its rejection. It is a temporarily accepted truth always subject to revision and modification by the presentation of further evidences for or against it. The history of scientific theories and philosophical speculations is a story of ever shifting points of view. In art and religion the end of the reasoning process is to objectify a direct, immediate vital experience, such as beauty or faith. Such experiences are not subject to proof or disproof by external evidences. The proof or disproof must come from within the experient. No one can prove or disprove a Beethoven Symphony or Jeremiah's conception of God. A painting or a psalm is a permanent monument to a vision of a creative mind.

The purpose of reasoning in science and philosophy is to examine the belief, to inquire as to its soundness, what evidences can be deduced in its favor, what grounds support or contradict it, and what consequences follow from it. The final result of the reasoning is either the formulation of a general law or the pointing out of the practical significance of the discovery. In art and religion the purpose of the reasoning is not to verify or demonstrate, but simply to express, to give

some permanent and adequate form to the imaginative product. The scientist and philosopher verify, the artist and religionist present. In both verification and presentation, reason functions as a means toward an end.

V

DISTORTIONS OF REASONING

A very common form of distorted reasoning has been given the name of rationalization. Dr. James Harvey Robinson gives the following excellent account of rationalization in his well-known book, *The Mind in the Making:*

Rationalization

I remember years ago attending a public dinner to which the Governor of the state was bidden. The chairman explained that His Excellency could not be present for certain "good" reasons; what the "real" reasons were the presiding officer said he would leave us to conjecture. This distinction between "good" and "real" reasons is one of the most clarifying and essential in the whole realm of thought. We can readily give what seems to us "good" reasons for being a Catholic or a Mason, a Republican or a Democrat, an adherent or opponent of the League of Nations. But the "real" reasons are usually on quite a different plane. Of course the importance of this distinction is popularly, if somewhat obscurely, recognized. The Baptist missionary is ready enough to see that the Buddhist is not such because his doctrines would bear careful inspection, but because he happened to be born in a Buddhist family in Tokio. But it would be treason to his faith to acknowledge that his own partiality for certain doctrines is due to the fact that his mother was a member of the First Baptist Church of Oak Ridge. A savage can give all sorts of reasons for his belief that it is dangerous to step on a man's shadow, and a newspaper editor can advance plenty of arguments against the Bolsheviki. But neither of them may realize why he happens to be defending his particular opinion.

The real reasons for our beliefs are concealed from ourselves as well as from others. As we grow up we simply adopt the ideas presented to us in regard to such matters as religion, family relations, property, business, our country and the state. We unconsciously absorb them from our environment. They are persistently whispered in our ear by the group in which we happen to live. Moreover, as Mr. Trotter has pointed out, these judgments, being the product of suggestion and not of reasoning, have the quality of perfect obviousness, so that to question them

> ". . . is to the believer to carry skepticism to an insane degree, and will be met by contempt, disapproval, or condemnation, according to the nature of the belief in question. When, therefore, we find ourselves entertaining an opinion about the basis of which there is a quality of feeling which tells us that to inquire into it would be absurd, obviously unnecessary, unprofitable, undesirable, bad form, or wicked, we may know that that opinion is a non-rational one, and probably, therefore, founded upon inadequate evidence."[1]

It is the psychiatrist and psychoanalyst who come in closest contact with the phenomenon of rationalization in patients suffering from obsessions, phobias, and other functional mental disorders. A patient with a suspicion neurosis can always give good reasons for his behavior, but they are good reasons that justify his conduct and not the real reasons that originally caused the ailment. It is the objective of the psychiatrist to discover the real reasons behind the good reasons in order to bring about a cure. So long as the person knows he is rationalizing, he is safe. The danger comes when the good reasons become established as the real reasons, and the person begins to deceive himself without knowing it.

In everyday life we find a number of slogans of the nature

[1] Harper & Brothers, 1921, pp. 41-43.

of rationalizations, which are a great convenience as justifications for actions about the rightness of which we have a "sneaking" suspicion. In the name of "business is business" we can engage in many shady deals that fatten our pockets. "Such is human nature" pacifies our moral scruples. "What you don't know doesn't hurt you" is an excellent excuse for not seeing what we don't want to see. "Once will not hurt you" is an underground outlet for our impulses which need control. Patriotism, religion, "the good of the cause," are capital cloaks under which to hide questionable motives. "My principal business is doing what little I can to build up splendid Christian character in that magnificent product of modern times, the American working-man," is the rationalization of the head of a business firm which advertises its products in the form of Biblical lessons. "Every Christmas I used to carry a full-page ad in the trade papers headed, 'God Bless Us, Every One,' and it was a little religious preachment in which I did not say a word about elevators except to wind it up with 'Hook 'er to the Biler,' and, of course, print our familiar cuts. Until I began some years ago to call attention to the fact, no one realized that the big business enterprises of this country are in the hands of men who stand for this noble business which for want of a better word we sum up under the name religion."

"So convenient is it to be a reasonable creature," said Benjamin Franklin, "since it enables one to find or make a reason for everything one has a mind to do."

By rationalization we defend ourselves against others by giving "reasons" for our actions; but more than that we defend ourselves against ourselves in the attempt to main-

tain our self-respect as being reasonable creatures. On this point Dr. Hart writes:

That a man generally knows why he thinks in a certain way, and why he does certain things, is a widespread and cherished belief of the human race. It is, unfortunately, for the most part an erroneous one. We have an overwhelming need to believe that we are acting rationally, and are loth to admit that we think and do things without being ourselves aware of the motives producing those thoughts and actions. Now a very large number of our mental processes are the result of an emotional bias or complex of the type we have described. Such a causal chain is, however, incompatible with our ideal of rationality. Hence we tend to substitute for it a fictitious logical process, and persuade ourselves that the particular thought or action is its reasonable and natural result. This is the mechanism of rationalisation seen in the example of the politician; we shall meet with further illustrations of its effects throughout the whole sphere of normal and abnormal psychology.

The prevalence of "rationalisation" is responsible for the erroneous belief that reason, taken in the sense of logical deduction from given premises, plays the dominating rôle in the formation of human thought and conduct. In most cases the thought or action makes its appearance without any such antecedent process, moulded by the various complexes resulting from our instincts and experience. The "reason" is evolved subsequently, to satisfy our craving for rationality.

The mechanism of rationalisation is most evident, perhaps, in the sphere of moral conduct, where we tend always to ascribe our actions to a conscious application of certain general religious or ethical principles. The majority of such actions are the result of habit, obedience to the traditions of our class, and other similar causes, and are carried out instinctively and immediately. The general principle is only produced subsequently, when we are challenged to explain our conduct. When the principle and the action do not entirely accord with one another, we amend the former by further rationalisations until it is capable of posing

as the explanation of the latter, and in this way preserve our ideal of rationality. Thus it is a familiar fact that people of otherwise irreproachable honesty will swindle the government or a railway company with untroubled equanimity. If they are taxed with the incongruity between their principles and their conduct, a varied crop of rationalisations will be immediately produced. They will point out that a company is not the same thing as an individual, that nobody really loses anything, that the fares or taxes are so inequitable that it is justifiable to evade them, and so on. The distinction between the real and apparent causes of mental processes is well illustrated in the advice given to the newly created judge, "Give your decision, it will probably be right. But do not give your reasons, they will almost certainly be wrong."[1]

The man who suffers from an inferiority feeling defends himself against himself by inventing some good reason why he is where he is, why he does not occupy a better position, why he is not high up in the councils of the mighty. He is not appreciated, or he is being discriminated against, or he is being held down by jealousy. Those responsible for the Spanish Inquisition had good reasons for persecuting the Jews—they wanted to save them from the fires of hell. The Nordics have good reasons, which they bolster up with statistics, for insisting on the inferiority of the other races—they want to save civilization. The moral crusader and censor have good reasons for minding other peoples' business and spreading charges and insinuations—they must make the world safe for virtue. The real reasons for their moral passion they either do not know or dare not examine. The political demagogue has good reasons for wanting to hold office—he is fired by a zeal to serve the people.

[1] HART, BERNARD, *op. cit.*, pp. 66-68; reprinted by permission of The Macmillan Company.

To rationalize is, then, to practice hindsight instead of foresight. It is to engage in some activity or to entertain some idea that is pleasant, and to seek a justification that will give the semblance of reason, that will appear rational. Every prejudice is a rationalization. That is, we can always give reasons for our prejudices, but the reasons we give are not the actual grounds for the attitude, but only an attempt on our part to justify the attitude. It is an unconscious self-deception. We want to be reasonable, but we also find it convenient to follow our habits and inclinations. Consequently, since the real reasons for our comfortable practices show us up in a bad light, we invent some good reasons which sound well.

A rationalization is thus not an explanation but a justification. An explanation relates to, and is in terms of, the facts involved in a situation. A justification ignores the facts or distorts and colors them to suit not the situation but the person involved in the situation.

Paranoia is an extreme, persistent and consistent form of rationalization. The normal person rationalizes occasionally, while the paranoiac lives a rationalization. He leads a rationalized existence. He harbors beliefs for which there are no real grounds. He is logical in his thinking, but the evidences for the conclusions are fantastic. The patient is seriously deluded. He builds a world of his own which is disconnected from the real world, and within this world his thinking is logical and his behavior adequate. He is immune to the real facts in any situation that concerns him. He can elicit great sympathy from persons who are unfamiliar with the fantastic nature of his complaint. The paranoiac is either under constant persecution, or his right

Paranoia

belongings are being withheld, or he has committed an unpardonable sin. The following is a typical case of paranoia:

A married woman (aged 55 years) was sent to the psychopathic service for observation, having annoyed many prominent people with letters of complaint about her husband and her children, and a certain physician who had been her family doctor. Her family history revealed no mental or nervous diseases. As a young girl she was quite suspicious and very sensitive. She admitted several homosexual diseases. She married at 22 years of age. Because of her suspicious nature her marital life was never happy. On one occasion, while visiting a friend, she approached this friend with homosexual intent and was strongly rebuked by the latter. She then began to make disparaging remarks about this friend, stating that she was very jealous, and that she was an immoral woman. When she was about 30 years of age, she burst out into a state of excitement, stating that her husband was being influenced by this friend, and was making efforts to get rid of her (his wife). However, she continued to live with him, and raised a family of six children. At the menopause, she again became somewhat excited; stated that her friend was again influencing her husband, and that the latter in turn was poisoning the minds of her children; that the reason why she was not liked by her children was due to this friend's animosity; on one occasion she tried to enter a theatre, but as all seats had been taken, she was obliged to stand. She then created a disturbance, stating that her friend was back of this. At the age of 47 she became quite unmanageable. She stated that her food was being poisoned by her husband; that she was being watched wherever she went. She sent a letter to the district attorney. She was finally committed to a state hospital. In the state hospital she was readily adaptable, and at first easily managed; but later, when she requested a privilege which could not be granted, she accused the ward physician of being in league with her family and her friend. She said that she was far more attractive than her friend, was much more clever than any of the nurses on the ward, and that everybody was

jealous of her. She kept writing to the various state officials voicing her grievances against the hospital authorities, so that the ward was subjected to an investigation. She was transferred by her family to a private hospital for the care and treatment of the insane and from there was released to the custody of one of her daughters. She secretly, however, kept on sending letters to prominent citizens so that it was necessary to have her recommitted to a state hospital. During her entire residence, the patient showed logically arranged thought. Her delusions were of a systematized nature, each event bearing a causal relationship to the preceding one. It is quite obvious, however, that the friend who repulsed her in early life could not have been at the bottom of all her troubles.[1]

SUMMARY OF PART III

We have seen in our study of intelligence that intelligence is the mental aspect of behavior. Intelligence is definable in terms of behavior, and behavior in terms of intelligence. The most intelligent animal is the one whose behavior is most complex, or the animal whose behavior is most complex is the most intelligent. Again, each factor in intelligence is definable in terms of behavior, and *vice versa.* The reflex is the beginning of behavior, while the sensation is the beginning of intelligence; and a sensation is a mental reflex. Reflexes give rise to habits, as sensations form into percepts; and a percept is a mental habit. Voluntary acts are modifications of established habits, while imagination is the modification of established percepts; imagination is mental voluntary action. To think is to exert, direct, and control mental effort, as to "will" is to exert, direct, and control muscular effort. To think or to reflect is to postpone the reaction to some prob-

[1] SANDS, I. J., and BLANCHARD, P., *Abnormal Behavior,* Dodd, Mead and Company, 1923, pp. 202-204.

lematic situation until the possible consequences of the possible reactions have been mentally traced out and rehearsed. Instead of *actually* making every reaction that occurs to us, we make all of them *mentally*, imaginatively. Imagination is mental exploration in the realm of old percepts, as voluntary action is motor exploration among old habits. In each case the result is the same: something new arising out of the old. Intelligence, in sum, is the mental adventure of discovery from the vague chaos of sensation to the definite order of imagination and reasoning; from that which is externally given as vague and indefinite, as sensation, to that which is internally shaped into the definite of perception and the novel of imagination.

PART FOUR

Summary and Restatement

¶ We began our study of human nature with the general fact of adjustment, and we return to it, in closing our analysis, by a summary of the process of adjustment which we call learning. We also take into account the source of the energy that drives the animal to act upon the environment; energy which is generated within the organism and which we know as emotion. In the process of adjustment through learning, the organism is ever growing and developing as a unit, an organic whole, from vagueness in infancy to more or less definiteness in adulthood; and in this growth there evolves the factor which we call personality. And we close our study with an account of the attempts that are being made to devise ways and means for measuring and testing the various factors of human nature that together form the human being as we know him and as we studied him.

CHAPTER XII

EMOTION AND FEELING

Questions this chapter seeks to answer: What is meant by emotion as the term is ordinarily used? What has the physiologist discovered about emotion? What is the basic nature and significance of emotion? Should we speak of emotions or emotional habits? Is emotion of any value to human beings? Can emotion be controlled? What is feeling, and how does it differ from emotion? How does it differ from sensation?

WE BEGAN our study of human nature by considering man as a machine for adjustment, what the machine consists of, and how it works. We then proceeded to study the products of the machine, mind and behavior, by means of which adjustments take place. We open our summary of human nature as a whole by returning to the topic of adjustment, but this time venturing a step farther and inquiring as to the source of the energy that makes the wheels of the machine go round, to which we give the name of emotion. We may not be able in our present state of knowledge of biochemistry to speak with much assurance about this basic matter, but sufficient data are available to permit of plausible theorizing.

There are three more or less obvious phases or aspects to emotion, a consideration of which will help us to understand

what emotion is in its basic nature. The most obvious of these aspects is its outer manifestations. An emotional state is often readily recognizable from the behavior of the animal. Not only is the animal excited, stirred up, restless, but at times it can perform feats of strength that exceed its normal powers. Less obvious, but nevertheless either directly observable or experimentally establishable, are certain internal occurrences such as increased pulse rate and rapid breathing, which are always present in emotional excitement. Then there is the mental aspect, namely, the consciousness that one is experiencing an emotion. The psychology of emotion is concerned with the relationship that exists between the outer manifestations, the internal processes, and the mental phenomenon: which of them constitutes emotion as such.

Emotion has three aspects

I

Outer and Internal Phenomena in Emotion

Charles Darwin was the first scientist to devote himself to a study of the biological significance of emotional behavior in animals and man. Here is his description of fear:

> The frightened man at first stands like a statue, motionless and breathless, or crouches down as if instinctively to escape observation. The heart beats quickly and violently, so that it palpitates or knocks against the ribs, but it is very doubtful if it then works more efficiently than usual so as to send a greater supply of blood to all parts of the body; for the skin instantly becomes pale as during incipient faintness. This paleness of the surface, however, is probably in large part, or is exclusively, due to the vaso-motor center being affected in such a manner as to cause the contraction of the small arteries of the skin. That the skin is much affected under the sense of great fear, we see in the marvelous manner in

Outer

which perspiration immediately exudes from it. This exudation is all the more remarkable, as the surface is then cold, and hence the term, a cold sweat; whereas when the sudorific glands are properly excited into action the surface is heated. The hairs also on the skin stand erect, and the superficial muscles shiver. In connection with the disturbed action of the heart, the breathing is hurried. The salivary glands act imperfectly; the mouth becomes dry and is often opened and shut. I have also noticed that under slight fear there is a strong tendency to yawn. One of the best marked symptoms is the trembling of all the muscles of the body; and this is often first seen in the lips. From this cause, and from the dryness of the mouth, the voice becomes husky or indistinct or may altogether fail. *"Obstupui steteruntque comæ, et vox faucibus hæsit."* As fear increases into an agony of terror, we behold, as under all violent emotion, diversified results. The heart beats wildly or must fail to act and faintness ensues; there is a deathlike pallor; the breathing is laboured; the wings of the nostrils are widely dilated; "there is a gasping and convulsive motion of the lips, a tremor on the hollow cheek, a gulping and catching of the throat"; the uncovered and protruding eyeballs are fixed on the object of terror; or they may roll restlessly from side to side, *huc illuc volvens oculos totumque pererrat.* The pupils are said to be enormously dilated. All the muscles of the body may become rigid or may be thrown into convulsive movements. The hands are alternately clenched and opened, often with a twitching movement. The arms may be protruded as if to avert some dreadful danger, or may be thrown wildly over the head. The Rev. Mr. Hagenauer has seen this latter action in a terrified Australian. In other cases there is a sudden and uncomfortable tendency to headlong flight; and so strong is this, that the boldest soldiers may be seized with a sudden panic.[1]

Other classic descriptions of various forms of emotional behavior are given by the physiologist Lange. Here is his description of joy:

[1] Expression of the Emotions in Man and Animals, Appleton, 1896, pp. 290-292.

A heightening of the functioning of the voluntary motor apparatus takes place, together with a dilation of the arterioles and capillaries. These are the two fundamental physiological symptoms by which the joyous one sustains his entire peculiar physiology. . . . He feels an increased motor impulse, moves swiftly and alertly, and gesticulates violently. Children jump, dance, clap their hands for joy. The facial muscles contract as a result of heightened latent innervation, and become round compared with the long, lax, hanging features of the melancholic person. Smiling and laughing are the results of the heightened impulse of facial and breathing muscles, as are also the high-pitched voice, singing, rejoicing, and the expression of involuntary impulses of the laryngeal and respiratory muscles. . . . The general dilation of the capillaries in joy results very strikingly in an increased flow of blood to the skin. A child's or a young girl's skin, which is white and transparent, reddens and glows with pleasure. The joyous person feels warm, his skin becomes fuller, he swells with pleasure. Increased glandular secretion also is observed: it is a common expression of satisfaction to say "the mouth waters" and "tears come easy." . . . But it is not only the external stamp of health which accompanies joy. . . . A rich blood supply to the organs and tissues of the body is naturally conducive to a strong nourishing activity, and hence all parts of the body thrive and are long preserved. The contented, active person is well-nourished and keeps young. That fat men are jovial—or rather, that jovial men are fat—is commonly accepted. It is based upon sound fact, that despots like to be surrounded by fat men, since their thriving condition bears witness of their contentedness, and therefore they are not easily dangerous. . . . A joyous person talks rapidly and fluently; his work proceeds swiftly, not only because his muscles are strong, but also because he reaches decisions quickly and puts them into prompt execution.

Another writer gives the following account of hatred:

Withdrawal of the head backwards, withdrawal of the trunk; projection forwards of the hands, as if to defend one's self against

the hated object; contraction or closure of the eyes; elevation of the upper lip and closure of the nose,—these are all elementary movements of turning away. Next, threatening movements, as: intense frowning; eyes wide open; display of teeth, grinding teeth and contracting jaws; opened mouth with tongue advanced; clenched fists; threatening action of arms; stamping with the feet; deep inspirations—panting; growling and various cries; automatic repetition of one word or syllable; sudden weakness and trembling of voice; spitting. Finally, various miscellaneous reactions and vaso-motor symptoms, general trembling; convulsions of lips and facial muscles, of limbs and of trunk; acts of violence to one's self, as biting fist or nails; sardonic laughter; bright redness of face; sudden pallor of face; extreme dilation of nostrils; standing up of hair on head.

In the above descriptions we have only statements of fact as to what happens in emotion, externally and internally. No statement as to any relationship between the two is ventured, nor as to the rôle the internal processes play in emotion. Nor did we have any data on the question until the year 1920, when Dr. Cannon of Harvard University published the results of his researches on the physiology of emotional excitement in his book, *Bodily Changes in Pain, Hunger, Fear, and Rage.*

Dr. Cannon found that marked internal changes automatically accompany strong emotional stress. One of the outstanding changes occurs in the stomach and intestines. In great excitement the churning of the stomach ceases, the intes- Internal
tines stop kneading, the digestive glands stop secreting the juice that prepares the food for absorption. Now it is significant that the cessation of the process of digestion brings about a change in the blood distribution of the body. The arteries in the digestive organs contract, which means that the delivery of blood to these organs is lessened, and the blood pressure increases in the arteries of other parts of the body. Since this

increase in arterial pressure is not accompanied by a contraction of the blood vessels of the brain, heart and lungs, these organs receive an extra supply of blood. When this happens, the heart begins to beat much more rapidly than its normal rate, which causes an increase of blood circulation through the body.

Now what does this increased blood circulation in emotion mean? The blood supplies the muscles with the sugar which is transformed by combustion in the muscles into available energy. Combustion requires oxygen. Since the blood is moving rapidly, it carries an extra supply of oxygen from the lungs to the muscles. At the same time the rapidly moving blood also carries away the waste products from the combustion, thus cleansing the muscles. This is only a part of the story as to what goes on in the visceral organs during emotion. The liver also changes its usual performance. The glycerin or animal starch stored in the liver changes to sugar, is set free into the blood stream, and carried over the body. More sugar for the laboring muscles! Then there are the adrenal glands. Adrenin, if injected into the blood, stops digestion, causes a rise of blood pressure, sends the blood from the digestive organs to the heart, to the central nervous system and the skeletal muscles, dilates the bronchioles, causing increased breathing or supply of oxygen to lungs, and liberates sugar from the blood. Its effect is precisely that produced by emotion. That is, it is an energy-producing agent.

How do the adrenal glands act in emotional excitement? The skeletal muscles are unusually active in such a state. This means that they fatigue rapidly. Now a minute amount of adrenin in the blood circulation refreshes the muscles as if by a miracle. It will also cause the blood to coagulate very

rapidly in case of a wound. A certain amount of blood that takes five minutes to coagulate under normal conditions will clot in one minute in emotional excitement. This means that in emotion the adrenal glands discharge an unusual quantity of their secretion into the blood, thus adding another source for the increase of muscular energy.

From the above physiological facts we see that emotion means essentially an energy-generating process, and that this process occurs in the viscera. The change in the functioning of the visceral organs means extra power for the skeletal muscles, the muscles that protect and defend. Physiologically, the emotion and the energy are one and the same thing. The energy we see and experience in emotion, and which we take as an indication of the *presence* of an emotion, *is* the emotion. Emotion is only a name we give to the energy generated in skeletal muscles by the visceral processes.

Emotion is bodily energy

Let us now summarize briefly the basic nature of emotion. All the visceral organs are under the control of the autonomic nervous system.[1] This system works automatically. The brain

[1] The skeletal muscles, as we have seen, are operated by the central nervous system. That is, the cell bodies whose nerve fibers run out to the muscles lie in the cord and brain. The glands and smooth muscles of the viscera, however, while connected with the central nervous system, are directly controlled by a series of nerves whose bodies lie wholly outside the central nervous system. The cell bodies of these neurones are collected in what are known as ganglia (the largest of which is the popular solar plexus, around which a number of myths have gathered in connection with pugilism and even the soul). Some of the ganglia are embedded in the visceral muscles (for instance, the heart and the stomach); others lie along either side of the spinal cord (in the trunk region), while a third group lies near the organs supplied by the neurones (large nerve plexuses in the thorax and pelvic part of the abdominal cavity). The connection between these outlying neurones that supply nerve fibers to the visceral muscles (known as postganglionic fibers) and the brain and spinal cord, is formed by nerve cells which lie in the central nervous organs. These connecting or preganglionic fibers form three divisions. The *cranial* or head division supplies fibers to the heart, lungs, stomach, intestines, salivary glands, eye pupils, and certain arteries. The *trunk*

has no conscious control over it. Hence, what happens when we speak of an emotion is as follows: The cat sees the dog. Instantly and automatically the visceral processes begin to function, the skeletal muscles become fired with energy, and the *cat acts emotionally*. It arches its back, its fur stands on end, its eyes shoot fire, it bares its teeth, it hisses, or instead of assuming this defensive attitude, it runs up a tree. What we call *an emotion* is the external manifestation of the energy generated by the internal, organic changes. But emotion is the energy, and the energy is the emotion, since if there were no energy there would be no emotion. Emotion is, elementally and basically, a visceral upheaval in the presence of an emergency situation which the ordinary system of reactions of the animal is inadequate to meet.

II

EMOTION AS CONSCIOUSNESS: THE JAMES-LANGE THEORY

The question arises as to the relationship between what we *call* an emotion, such as *fear* and *anger*, and the *organic*

or thoracic-lumbar division (known also as the "sympathetic system") is directly involved in emotional phenomena. Its fibers are distributed widely throughout the body: to the eyes, causing dilation of the pupils; to the heart, causing rapid beating when stimulated; to the smooth muscles attached to the hair, causing hair erection; to the sweat glands, causing sweating; to the gastro-intestinal canal; to the abdomen and all along the gut, causing inhibition of the digestive process in pain and emotional states; to the genito-urinary tract; to the liver, causing the outpouring of its secretions into the blood. The *sacral division* comprises three nerves innervating the bladder, rectum, and the arteries of the external genitals. These three divisions of nerve fibers—cranial, thoracic-lumbar, and sacral —constitute together what is known as the autonomic nervous system. The function of the sympathetic division is antagonistic to those of the sacral and cranial. Thus, anger or fear, in which the sympathetic division mediates, inhibits digestion, which is controlled and regulated by the cranial division; and, similarly, fear or anger will eliminate sexual desire, which is under the domination of the sacral division.

changes just discussed. Which is cause and which is effect? Are the organic changes caused by the consciousness of fear, or is the fact that I know I am afraid the result of the organic changes? This problem was first raised by William James, and his answer to it is known as the James-Lange theory, since James and the physiologist Lange published papers dealing with the question at about the same time, although independently. Here is James' statement of the theory.

Conscious emotion is a cluster of organic sensations

My theory . . . *is that the bodily changes follow directly the perception of the exciting fact, and that our feeling of the same changes as they occur, IS the emotion.* Common sense says, we lose our fortune, are sorry and weep; we meet a bear, are frightened and run; we are insulted by a rival, are angry and strike. The hypothesis here to be defended says that this order of sequence is incorrect, that the one mental state is not immediately induced by the other, that the bodily manifestation must first be interposed between, and that the more rational statement is that we feel sorry because we cry, angry because we strike, afraid because we tremble, and not that we cry, strike, or tremble, because we are sorry, angry or fearful, as the case may be.[1]

This theory presents various ramifications and is open to many interpretations and misinterpretations. But it is clear that James means that what we experience as emotion *is the conscious phase of the organic changes*, that the conscious emotion is the mental effect of which the organic upheaval is the stimulus, and not *vice versa.*

This theory is probably correct, and it is supported by biological and physiological facts. In the first place, what is of significance biologically is not so much that an animal

[1] *Psychology* (briefer course), Holt, 1893, p. 375.

should *know* that it is afraid but that it should *act* afraid. In walking across the street in heavy traffic it is of biological importance that I jump out of the way on hearing a sound, and not at all that I should be conscious of fear. What happens in the process is

sound——jump——fear

and not

sound——fear——jump

We find, next, that the cortex, the seat of consciousness, is not at all necessary for emotional expression. Even when this structure is missing, emotional behavior occurs unimpaired. A cat with its hemispheres removed will snarl, bare its teeth, and its hairs will be erected, when confronted by a barking dog, just as if its brain were intact. So long as its visceral and skeletal muscles are functioning, the animal manifests emotional activity.

What occurs in emotion, as a conscious phenomenon, is similar to what happens in hunger. When the stomach is empty its walls undergo rhythmic contractions. Those contractions serve as stimuli for impulses to the brain, giving rise to the consciousness of hunger. Here we have a well-known instance of visceral activity resulting in consciousness. Similarly, the visceral changes which are the basis for the muscular effects which constitute emotion, behavioristically, are also the stimuli for the psychological effect which we know as emotion, mentally. Psychologically, emotion is therefore the cognitive aspect of the physiological processes stirred up by a situation which is natively or habitually unwelcome or dangerous or unusual to the organism.

III

EMOTION OR EMOTIONS?

It is a mistake to speak of specific emotions, such as anger, fear, jealousy, envy, etc. These are not *emotions*, but rather acquired forms of behavior, or habits, that have grown out of *emotion*. Emotion is a provision of nature for the mobilization of the energy resources of the organism to meet a critical situation. Emotion is dynamic. It arouses the animal from its routine modes of behavior which are inadequate to meet a sudden critical, special situation which demands immediate action. Now in the infant we meet with no more evidences for the existence of specific emotions than we do for specific instincts. We find *emotion*, native energy, as we find *instinct*, native behavior. But this native energy is as haphazard, random, and therefore useless, in its original form, as is the native behavior before it is split up into habits. Deny any limb of the infant its freedom of movement for any length of time, or remove the support from under it, or make a sudden loud noise or a sudden movement in its presence, and there will be ample evidences of the presence of an unusual supply of emotional energy. But there is nothing in the behavior that resembles any specific emotional act of the adult. All infants display emotional outbursts under the circumstances mentioned above, the only difference between them being that some will be more vehement than others. But in all of them the outburst consists of a chaos of squirmings and twistings. In the older child or adult, these squirmings are not only displaced by specifically effective acts, but, what is even more important, the acts vary from person

The various emotions are habits that grow out of emotional energy

to person, so that the fear or anger acts of one individual are quite different from those of another. We meet here, then, with the same situation that we found in other habits, namely, the emergence of the definite out of the indefinite as a result of training and experience, and that training and experience have different effects upon the same native material. There are therefore no emotions, in the sense of specific native forms of emotional responses. There are only emotional habits. How emotional habits arise out of emotions we have seen in Dr. Watson's experiments on infants.

IV

THE CONTROL OF EMOTION

There are biological, physiological and psychological reasons for the control of emotion. For the adult human being, emotion has lost its biological meaning; but it is harmful in that it often leads to serious mental and behavior disturbances. We have seen that, biologically, emotion is extra energy generated in times of stress to meet an unusual situation or a situation dangerous to life. The fury of the mother bird against an approaching cat or dog serves her well to ward off the enemy. The animal is in constant danger and needs extra energy for the protection of life and limb. The animal, furthermore, gets rid of the energy as soon as it is generated, as does also the infant. But adult human beings are seldom, if ever, confronted by situations where they must depend solely upon sudden physical strength for safety. Not only is there no need for the extra energy, but social custom prohibits its free expenditure when generated. It is therefore harbored, the anger is "swallowed," the jealousy,

Emotion has little value for human beings

fear, envy, suppressed; and here is where the mischief begins physiologically and psychologically. In psychoanalytic literature we find no end of evidence of the havoc wrought by suppressed emotional energy, and physiological experiments show that emotional energy is poison to the system. The common experience of sad news or sudden fear robbing one of appetite for food is enough to show what emotional excitement does to our "insides." The man who cannot engage in a discussion without getting excited unless things go his way, who does all his thinking with his sympathetic nervous system, is shunned in the councils of men and leaves nothing but confusion and ill will in his tracks.

It can be controlled

The way to emotional control is direct and simple, requiring nothing but decision and persistence. Since a specific emotion is a formed habit, it can also be unformed. Let us take an illustration which will suggest numerous ramifications and applications. A young boy having developed fear of rabbits, white rats, and other perfectly harmless animals and objects, was placed in a room about forty feet long. He was seated at a table on which his lunch had been placed, covered with a napkin. At the other end of the room was a rabbit in a cage, also concealed from the boy's view. When the food and rabbit were uncovered for the first time, the child could eat only when the animal was at a certain distance from him. When the boy got accustomed to the rabbit at a certain distance and paid no attention to it, the animal was brought somewhat closer the next day. Gradually, after a few days, the rabbit could be placed on the table without disturbing the boy, and a day or two later he would hold it in his arms. The fear had disappeared. This experiment suggests to the thinking adult that the problem of emotional control reduces

itself to a substitution of one habit for another habit. To practice maintaining a calm attitude before a situation that arouses one to a pitch of excitement is to get to control the emotion aroused by that situation. It is simply a matter of substituting one form of behavior for another form. A depressed mood can be gotten rid of by enacting a cheerful one, and hatred disappears when actions of friendliness are engaged in. The difficulty is that we enjoy the emotion and hence make no effort to control it. A mere wish to get rid of a certain emotional habit will never drive it away. Nor will the universal consolation, "I can't help it, I'm made that way." It was Aristotle who, centuries ago, assigned to the brain the function of serving as a sort of refrigerating plant to cool the too fervid animal spirits, a function the brain can well fulfill provided, however, one really wants it to do so.

V

THE NATURE OF FEELING AND ITS ATTRIBUTES

At the very outset of our examination of human nature we found two basic characteristics of animal life, namely, the presence within the organism of energy in a state of unequilibrium ready for release at a signal or stimulus, and the manifestation of this energy in acts and attitudes which carry out essential life needs or urges. If we observe an animal in its comings and goings, we readily notice that all its actions and attitudes are either toward or away from things. It either approaches or avoids, attacks or invites, is either attracted or repelled. The evidences for the attraction-repulsion characteristic of all behavior are often so slight as to be practically imperceptible. But delicate instruments reveal the fact that it

is invariably present to some degree. Attraction and repulsion are states of increased muscular activity, heightened tonicity, departures from complete restfulness. And it is in attraction and repulsion that the primary feelings of pleasantness and unpleasantness occur. That which attracts yields pleasantness, while that which repells is a source of unpleasantness. Apparently there is a close relationship between muscular activity and feeling. The critical question, therefore, as to the fundamental nature of feeling is, What is it that is happening within us which causes us to experience a certain feeling? In other words, what is the stimulus for feeling? It is in answer to this question that we enter the realm of theory, supported, however, by some facts. The important point to bear in mind here, in order to avoid confusion, is that the report "I feel" is entirely similar to the report "I see" or "I hear," in that both are instances of a stimulus causing a sensation. The sensation "I hear" is auditory, and we know its stimulus. Likewise with "I see." But what is the sensation "I feel" a sensation of?

Feeling is an aspect of activity

As the first step toward an answer to this question, let us recall the statement made in connection with the discussion on the traits of sensation, namely, that every sensation has a feeling-tone. A sound is felt to be either pleasant or unpleasant, or at least more pleasant than unpleasant, or *vice versa.* We have, then, two elements in the sound sensation, the hearing and the feeling. The hearing comes from the outside —that is, the stimulus is outer. The feeling comes from within ourselves; its stimulus is inner. But this is a mere beginning. Inner what? Muscular sensations are also inner, but every muscular sensation also has a feeling-tone. Hence the seat of feeling is not only inner, but in a place other than

the muscles from which we get kinæsthetic sensations. The above facts justify us in locating the source or stimuli of feeling-sensations in the visceral system. And we are fortified in this conclusion by the consideration that the inner and outer physiological manifestations of feeling, namely, organic changes and heightened muscular tonicity, are like those of emotion, only in a lesser degree. That which is pleasant is characterized by a tendency to move towards the source of the pleasantness, that which is unpleasant to move away from it. Hence we may say that just as a conscious emotion is the psychological aspect of a violent organic upheaval, so feeling is a general sensation having for stimulus a constellation or cluster of more normal visceral processes that accompany all ordinary experience. Feeling, in sum, is faint emotion. We call feeling the general sensation resulting from the total effect produced by normal visceral activity upon skeletal musculature, resulting in a more or less perceptible movement toward or away from a stimulus. A feeling means a change in general bodily state of being. Most of the changes are so slight that the general sensation produced is too faint to reach the threshold of consciousness. But the living body is never in a completely neutral state. It always oscillates somewhat above and below neutrality. There is no neutral feeling, only subliminal feeling. In sum, a feeling is a complex of organic sensations, the mental resonance of a physiological state.

Feeling is sensation of normal visceral activity accompanying all activity

Since feeling is basically sensation, it has the same attributes as sensation, namely, vividness, after-effects, contrast, etc. But feelings have one trait which sensations do not possess. A sensation is always referred to the object of which it is a sensation. It is only in theory that we separate the sensation

from that which causes the sensation, never in practice. It is always the object that is red or green, the object that is sweet or sour, the object that is heavy or light. But in the realm of feelings we find the peculiar situation that at times a feeling is spoken of as belonging to the object of which it is a feeling and at times it is referred to the subject who has the feeling. We say, "this makes me feel good or bad," but never, "this makes me see or hear." Even philosophers are practical people in this matter, since they quarrel as to whether sensations are part of the object or only subjective phenomena; but about feeling they have never raised this question. But not all feelings are referred to subjectively. Sometimes they are spoken of as belonging to the object. The statement, "I enjoyed the music," is similar to the statement, "I see red." It is the melody that is pleasant, as it is the object that is red.

Feelings are referred to object or subject

This peculiarity of feeling cannot be altogether explained by the fact that some feelings can be localized in a certain part of the body—as the taste of food, for instance—and are therefore referred to the body, while others cannot be localized and are therefore referred to externally. Sensations are localized more than feelings, but are always experienced as external. Furthermore, one of two persons may refer the feeling to the subject; the other, the same feeling to the object. The taste of grape juice will be referred subjectively by one who is thirsty and objectively by one who is not thirsty.

The difference is one of attitude, whether the feeling is *motive-full* or *motive-less*. A feeling may be *for* a thing, or *over* a thing. A feeling for a thing, if pleasant, is *enjoyment*; if unpleasant, *boredom*. A feeling *over* a thing, if pleasant, is *rejoicing*; if unpleasant, it is *grieving*. I enjoy a walk, but

I do not rejoice over it. I rejoice in getting over the mumps, but I do not enjoy it. I enjoy the walk for its own sake. I rejoice in getting over the mumps because I will be able to return to work. When asked why I enjoy the walk, my answer will be in terms of the walk itself, because I like to walk. My reason for the rejoicing will be in terms of something that is related to the mumps, and not in terms of the mumps. The cause for enjoyment is in the object of enjoyment; that for rejoicing is outside the object of rejoicing. For enjoyment there is no motive besides the object itself; it is motive-less. For rejoicing there is a motive beyond the object itself; it is motive-full. I may either enjoy the arrival of an acquaintance, or rejoice over his arrival, or both. But I do not enjoy for the same reason that I rejoice. I enjoy his arrival because I like him. The enjoyment is in the arrival. I rejoice over his arrival because he can help me settle a problem. The rejoicing is not in the arrival but in what the arrival means to me, which lies outside of him. The enjoyment I refer to his presence; the rejoicing, to my need for help. One feeling I therefore localize in the acquaintance, the other in myself. I enjoy a bell because the sound pleases me, and the sound is in the bell. I rejoice hearing the bell because it means I'm free to go. The free-to-go is in me and not in the bell. Motive-full feelings are practical feelings; motive-less feelings are æsthetic feelings. In practical feelings there is reflection, the reference of an object to something beyond itself, to some need or purpose. Æsthetic feelings occur in contemplation, when there is nothing in mind except the impression produced by the object. It is noteworthy that æsthetic feelings fade and disappear when attention is directed on them. When you look at a hat and think how well it would look on you,

the more you think, the more you want the hat and the greater would be the rejoicing in getting it. But when you are listening to music and you begin to think how you are enjoying it, the enjoyment will immediately be displaced by the thought.

There are only two elementary feeling-sensations, pleasantness and unpleasantness, or pleasure and displeasure, or agreeableness and disagreeableness. There is no need biologically for more than these two, since nothing more is required for the behavior of the animal. A stimulus is either beneficial or harmful in various degrees. It is therefore either to be approached or avoided. It is either good or bad, food or poison, enemy or friend. The body is to be maintained, life is to be preserved. That which is pleasant naturally, elementally, helps to preserve it; that which is unpleasant tends to destroy it. It is only man who forms a habit of liking that which is detrimental to his welfare, which runs contrary to basic organic needs. The only animal that can best preserve life is also the only one that can best destroy life. Nature supplies the means. The animal uses the means as they were intended to be used. It knows no better. Man does know better, to his joy and to his sorrow.

Feelings are simple or mixed

Feeling constantly fluctuates and mixes. The pleasant shades into the unpleasant and the unpleasant into the pleasant. Often the two are so mixed that one does not know whether he is happy or unhappy. Love, for example, is a hopeless mixture of joy and sorrow. It is pleasant to realize an ambition, but it leaves one with a feeling of emptiness, of unpleasantness. The young girl is having a good time weeping, and there are persons who are happy only when they have something to grieve over. Wonder, curiosity, dis-

gust, envy, jealousy, awe, pity, sympathy, are all mixed feelings, oscillating between pleasantness and unpleasantness so rapidly and grading into each other by such delicate shadings that one seems to have two feelings at the same time. A thing may be so repulsive that it attracts.

VI

TEMPERAMENT, SENTIMENT, MOOD, DISPOSITION

Temperament is constitutional susceptibility to emotional excitement. From almost the first day of birth, temperamental differences are observable in human infants, and these become intensified as the environment begins to exercise the native tendency. A mood is the temporary state of the temperament. An intense, warm temperament is naturally more subject to fluctuations in mood than is a cold temperament. The former, unless well controlled, always fluctuates between the peaks of elation and the depths of depression. There is hardly ever a medium state. The milder temperaments lead a more even and calm existence, but their life is also less colorful. The intense temperament, when well under control, makes the most interesting and colorful personality. When not controlled there is danger of developing psychopathic behavior.

Temperament

Sentiment is a constellation or cluster of emotions and feelings grouped around some one object or idea. A sentimental person is one who readily and easily forms such constellations. Patriotism, philanthropy, religion, family love, school spirit, loyalty, are examples of sentiments. Our prejudices are essentially sentiments. Each sentiment is a mixture of several emotions and feelings. Thus patriotism is a mixture of love,

hatred, fear, anger. We love our country, we hate for her, fear for her, and our anger is aroused in her defense. Sentiments are social assets, in that they tend to solidify group life, extending from family to race. But they also become social liabilities, since they tend in the direction of intolerance of anything that does not readily fit into the particular constellation.

Sentiment

A sentiment is a conscious mental attitude. A disposition, on the other hand, is a constellation of emotional habits around some situation. Politeness, boorishness, aggressiveness, humility, gentlemanliness, kindliness, generosity, graspiness are dispositions. Dispositions are unconscious in that the acts have become, as we say, second nature to the person. A sentiment becomes a disposition when it has passed from the level of mental attitude to that of habitual practice. We may say, then, that a disposition is a thoroughly ingrained sentiment. A person may be philanthropically sentimental, but in disposition, grasping. We call a person in whom sentiment and disposition are at variance a hypocrite. A sentiment is often but a cloak that hides an opposite disposition. The world is full of beautiful sentiments, and they pour forth daily in vast numbers from the mouths of statesmen, politicians, reformers and moralists. But quite often the dispositions behind these sentiments spread hatred, distrust and cause wars. The fate of Woodrow Wilson at the Peace Conference is a sad but enlightening commentary on the discrepancy that may, and often does, exist between sentiment and disposition.

Disposition

CHAPTER XIII

LEARNING: ITS TYPES AND LAWS

Questions this chapter seeks to answer: What is meant by the evolution of learning? What are the steps in this evolution? What advantages does man have over other animals as a learner? What are the different kinds of learning and their relative advantages? What conditions favor and hinder learning?

WE HAVE been considering learning all along while tracing the development of behavior and intelligence from the raw native materials of reflexes and sensations through habits and percepts to voluntary acts and imagination. Here we shall bring together in one place several scattered topics which were touched upon incidentally before, but not stressed. We have been dealing constantly with the one central fact that life means adjustment, and adjustment means learning. An animal that cannot learn cannot go on living. All animals can and do learn. There is however a difference in *what* they can learn, in *how much* they can learn, and in *how* they can learn. The *what, how much*, and *how* give rise to three general topics in the psychology of learning, namely, its evolution, its types, and its laws.

I

THE EVOLUTION OF LEARNING

The behavior of a single-celled organism is of the nature of a reflex. In higher animals a reflex act has for its structural basis nerve connections from sense organ to muscle via a nerve center. Single-celled animals have no central system, but they have some sort of effector organs and conducting mechanism. This enables them to perform acts of the reflex type, although the acts are not true reflexes. But even such acts are not wooden and mechanical. They are vital behavior in that they are subject to modification. Protozoa can learn. When the common Infusorian Paramecium is confronted by obstacles such as heat, or various chemical substances, it will cease its normal forward swimming movements, and will back, turn, and move in a new direction. It extricates itself from difficulties. If the first trial does not remove it from the difficulty it will try again and again until it either escapes or perishes. It tries, and it either errs or succeeds, by mere chance. The performances do not cease until the organism either saves itself or is destroyed.

Learning begins with reflex type of behavior in animals minus cord

The behavior of the early Metazoa, such as a sea anemone, differs from that of the Protozoa primarily in that the separate parts of the body are capable both of an independent reflex and also of working together, because of the physical cohesion of the parts. The behavior of the Metazoa is made up of a republic of elementary reflexes, each of which works in harmony with the others, but is independent of the others.

The appearance of a central nerve cord in the Vertebrates brings the reflexes together into a unit of behavior. It makes

possible chain reflexes, or a single act made up of several component acts. This is the advent of instincts, or native, complex pattern reactions to specific situations. Instincts are subject to modification or learning of a higher sort than simple reflexes. The chick at birth pecks at anything that looks interesting, and its pecking is inaccurate. It strikes, but it may or may not hit the object. Gradually the pecking becomes accurate and discriminating. Inaccurate movements are eliminated, and harmful or inedible objects are disregarded. Useless movements and useless stimuli are displaced, as a result of experience, by that which is useful. The organism chooses its stimuli and reacts to them with thorough effectiveness. The higher Vertebrate is also enterprising and adventuresome, traits which expand its environment and therefore its range of learning. Since the young remain with the parents for a period of time they learn indirectly from the old as well as being directly taught by them. Hence not only is the range of learning increased, but the source of learning is also enlarged.

Instincts appear in animals possessing cord

The Mammals can learn more readily and more completely everything that lower Vertebrates can learn, and they can also learn what is beyond the other Vertebrates. Experiments with typical Mammals, such as cats, racoons and pigs, show that they can learn to perform such comparatively difficult feats as undoing complicated fastenings. They accomplish these feats by trial and error, by elimination of the unsuccessful and the retention of the successful. But the trial and error is a vast advance upon that of lower Vertebrates. In higher Mammals, such as monkeys, a completely new form of learning appears. These animals engage in actual experimentation and manipulation. "Their free hands and nimble

fingers itch to be employed, and they employ them as a child does, for the sake of doing something, of new sensations, and of the sense of power. They further show a slightly increased capacity for imitation, and, in general, their behavior has progressed to a pitch at which it is hard to say whether or not true ideas or at least images must be postulated." [1]

Instinct is followed by manipulation, experimentation, and insight

In still higher Mammals, like the anthropoid apes, all doubt as to the presence of ideational learning disappears. In recent years the German psychologist, Köhler, has been experimenting on the mentality of apes. One of his apes, Sultan by name, was given the problem of obtaining bananas which were outside his cage and beyond the reach of his arms. Two hollow bamboo sticks were placed in his cage. Previously to this experiment Sultan had learned to use a single stick with which to pull in fruit. Of the two sticks now given Sultan, one was so much thinner than the other that it could be pushed in at either end of the other quite easily. Here is the account of Sultan's solution of the problem:

> Beyond the bars lies the objective, just so far away that the animal cannot reach it with either rod. They are about the same length. Nevertheless, he takes great pains to try to reach it with one stick or the other, even pushing his right shoulder through the bars. When everything proves futile, Sultan commits a "bad error," or more clearly, a great stupidity, such as he made sometimes on other occasions. He pulls a box from the back of the room towards the bars; true, he pushes it away again at once as it is useless, or rather, actually in the way. Immediately afterwards, he does something which, although practically useless, must be counted among the "good errors": he pushes one of the sticks out as far as it will go, then takes the second, and with it pokes the first one cautiously towards the objective, pushing it carefully from the

[1] McDOWALL, *et al.*, *The Mind*, Longmans, Green, 1927, p. 33.

nearer end and thus slowly urging it towards the fruit. This does not always succeed, but if he has got pretty close in this way, he takes even greater precaution; he pushes very gently, watches the movements of the stick that is lying on the ground, and actually touches the objective with its tip. Thus, all of a sudden, for the first time, the contact "animal-objective" has been established, and Sultan visibly feels (we humans can sympathize) a certain satisfaction in having even so much power over the fruit that he can touch and slightly move it by pushing the stick on the ground so far out that he cannot possibly get it back by himself; it is given back to him. But although, in trying to steer it cautiously, he puts the stick in his hand exactly to the cut (*i.e.*, the opening) of the stick on the ground, and although one might think that doing so would suggest the possibility of pushing one stick into the other, there is no indication whatever of such a practically valuable solution. Finally, the observer gives the animal some help by putting one finger into the opening of one stick under the animal's nose (without pointing to the other stick at all). This has no effect; Sultan, as before, pushes one stick with the other towards the objective, and as this pseudo-solution does not satisfy him any longer, he abandons his efforts altogether, and does not even pick up the sticks when they are both again thrown through the bars to him. The experiment has lasted over an hour, and is stopped for the present, as it seems hopeless, carried out like this. As we intend to take it up again after a while, Sultan is left in possession of his sticks; the keeper is left there to watch him.

Keeper's report: "Sultan first of all squats indifferently on the box, which has been left standing a little back from the railings; then he gets up, picks up the two sticks, sits down again on the box and plays carelessly with them. While doing this, it happens that he finds himself holding one rod in either hand in such a way that they lie in a straight line; he pushes the thinner one a little way into the opening of the thicker, jumps up and is already on the run towards the railings, to which he has up to now half turned his back, and begins to draw a banana towards

him with the double-stick. I call the master: meanwhile, one of the animal's rods has fallen out of the other, as he has pushed one of them only a little way into the other; whereupon he connects them again."

The keeper's report covers a period of scarcely five minutes, which elapsed since stopping the experiment. Called by the man, I continued observation myself; Sultan is squatting at the bars, holding out one stick, and, at its end, a second bigger one, which is on the point of falling off. It does fall. Sultan pulls it to him and forthwith, with the greatest assurance, pushes the thinner one in again, so that it is firmly wedged, and fetches a fruit with the lengthened implement. But the bigger tube selected is a little too big, and so it slips from the end of the thinner one several times; each time Sultan rejoins the tubes immediately by holding the bigger one towards himself in the left, and the thinner one in his right hand and a little backwards, and then sliding one into the other. The proceeding seems to please him immensely; he is very lively, pulls all the fruit, one after the other, towards the railing, without taking time to eat it, and when I disconnect the double-stick he puts it together at once, and draws any distant objects whatever to the bars.

The next day the test is repeated; Sultan begins with the proceeding which is in practice useless, but after he has pushed one of the tubes forward with the other for a few seconds, he again takes up both, quickly puts one into the other, and attains his objective with the double-stick.

The objective lies in front of the railing, still farther away; Sultan has three tubes to resort to, the two bigger ones fitting over either end of the third. He tries to reach his objective with two tubes, as before; as the outer one keeps falling off, he takes distinct pains to push the thinner stick farther into the bigger one. Contrary to expectations, he actually attains his objective with the double tube, and pulls it to him. The long tool sometimes gets into his way when doing this, by its farther end getting caught between the railings, when being moved obliquely, so the animal quickly separates it into its parts, and finishes the task

with one tube only. From now on, he does this every time when the objective is so close that one stick is sufficient and the double-stick awkward. The new objective is placed still further away. In consequence, Sultan tries which of the bigger tubes is more useful when joined to the thin one; for they do not differ very much in length and, of course, the animal does not lay them together to compare their lengths. *Sultan never tries to join the two bigger tubes*; once he puts them opposite to each other for a moment, not touching, and looks at the openings, but puts one aside directly (without trying it) and picks up the third thinner one; the two wide tubes have openings of the same size. The solution follows quite suddenly: Sultan fishes with a double-stick consisting of the thinner one and one of the bigger ones, holding, as usual, the end of the smaller one in his hand. All of a sudden he pulls the double-stick in, turns it round, so that the thin end is before his eyes and the other towering up in the air behind him, seizes the third tube with his left hand, and introduces the tip of the double-stick into its opening. With the triple pole he reaches the objective easily; and when the long implement proves a hindrance in pulling the objective to him, it is disconnected as before.

According to observations in this experiment, Sultan never attempted to join tubes which would not have fitted together. Once, when an experiment was to be shown to visitors, I put down the objective outside, and at the same time threw two different-sized tubes, which happened to be at hand, through the bars to Sultan. He took hold of them at once, the bigger one, as usual, in his left hand, the thinner, in his right, and was already lifting his right hand to connect the tubes, when he suddenly stopped, without carrying out his intention, turned the thick tube around, looked at its other end, and immediately dropped both tubes to the ground. I let him pass them out to me and discovered that both ends of the wider one happened to have a nodule, thus closing the opening; in these circumstances Sultan did not even attempt to connect the tubes. When I cut away this closed part, he made the trial at once.

The wide tube is closed at one end; a wooden block is put

into the other end before the experiment; it sticks out just a little, being somewhat narrower than the tube, so that a space is left between it and the tube. Sultan seizes the tubes, looks for a moment at the block in the hole, tries to squeeze the thinner tube into the narrow opening between the block and the side of the tube, fails, and straightway pulls out the stopper, throws it aside, and connects the tubes.

Sometimes, however, he experiences a difficulty, where one would least expect it. Holding both tubes in his hand and wanting to proceed as usual to connect them, he hesitates for a few minutes and seems strangely uncertain; this is when the tubes lie in his hand in certain positions, namely, almost parallel, or else across each other in the shape of a very narrow "X." This difficulty has now almost disappeared, but at first it occurred frequently. When Chica had, later on, adopted the same procedure, she showed exactly the same embarrassment when the two tubes were in this position, and her embarrassment was even more striking than Sultan's. As soon as the animals have again optically separated one tube from the other, the action proceeds quite smoothly. The optical factor in the situation, which at other times is a sure guide to the chimpanzee, making his acts and his behaviour appear the direct result of it, must in this case be changed so that it does not determine the motor factor quite so definitely. We humans can always see the relative position of two tubes like this clearly enough not to be thus embarrassed, but if slightly complicated conditions (unfolding a folding-couch) be introduced, we too take some seconds to readjust, before our vision can dictate our movements.[1]

Thus far we have traced learning from blind trial and error in Invertebrates through habit and memory in Vertebrates, to the dawning of imagination and reason in the highest apes. In man, learning by imagination and reasoning reaches its peak. Imagination and reasoning mean creative

[1] KÖHLER, *op. cit.*, pp. 130-135.

The highest learning is imagination and reasoning

learning, an adventure into a world beyond direct perception. By these mental powers man not only extends the confines of his environment, but he obtains new light on its nature and is able to transform it according to his needs and desires into a more comfortable and convenient place for him to dwell in. Thus he learns continually and grows permanently. Man can learn not only that which he has to learn in order to live, but that which enables him to live more, to live longer, and to live better. By the power of speech, verbal and written, he can make a record of what he has learned and hand it on from generation to generation as the beginning for a new learning adventure. Briefly, by his increased learning power man is enabled to build a civilization, since he can not only adjust himself to his world supremely well, but can also modify his world to suit his wishes and desires. Learning begins in the lower forms of life with the animal being able to adjust itself to the demands of the environment. It culminates in the highest form of life with the animal being able to adjust the environment to itself according to its own demands. Learning progresses from the condition when matter dominates over life to that when life dominates over matter. Man can learn most, can keep on learning most, can learn most rapidly, can learn most thoroughly and effectively, and can make most use in the most effective manner of what he learns.

II

THE TYPES OF LEARNING

We note from the foregoing brief sketch that learning is an unbroken continuous progression from the simple to the com-

plex, from the somewhat efficient to the most highly efficient. In this continuity, however, we can readily recognize a gradual change taking place in the *predominant activity* present during the process of learning and in the *end result* of the learning. In lower animals the learning process is predominantly motor or muscular. They engage in a mass of random, fumbling, exploratory, overt activities; and if conditions are favorable, and the activities are persisted in, a successful adjustment to a situation ensues. Among highest animals, particularly the highest Mammals, motor activity is gradually supplemented, and even displaced, by mental activity. Sultan, for instance, does not engage in random movements, but seems to deliberate, to think, to put two and two together, and act only after having reached a conclusion. Something inside him tells him what to do, and when he acts he does so with a purpose; he appears to know what he is doing. What he does is not the result of chance but of choice. Mental learning has the advantage over motor learning in that animals capable of learning by deliberation save themselves a great deal of effort by delaying the final reaction until they have discovered what is to be done in a given situation. Such animals learn intelligently, not blindly. A great deal of learning, even in man, is of the blind, fumbling kind. But among animals that can learn intelligently, even blind learning is more efficient than among animals whose learning is primarily motor. There is, therefore, motor learning all along the line of evolution, from Protozoa to Man. But mental learning occurs only in organisms which possess a somewhat highly evolved cortex that makes delayed reaction possible.

Learning is a continuous process

The differences in the end result between motor learning

and cerebral learning will become clear if we consider a few illustrations.

a.—MOTOR LEARNING

Motor learning includes three processes: elimination, combination, and coördination.

The cat in a puzzle box is a case of learning by elimination in higher animals. If the cat is to get to the fish lying outside

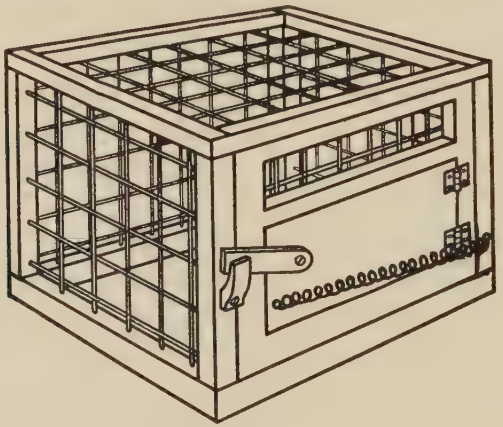


FIG. 17.—A PUZZLE BOX (FROM WATSON). THE ANIMAL CAN OPEN THE DOOR BY RAISING THE LATCH L.

In some animals learning is primarily motor, as elimination, combination or coördination

its cage, it must pull a string or turn a button which releases it from the box. When first placed in the box the animal claws and scratches, engages in a mass of random movements in the attempt to get out, until it hits by mere chance upon the successful movement that releases it. On repeated trials the number of random movements decreases, and finally only the successful movement remains. Now this movement was present at the very beginning among the other random fumblings. The learning process therefore consisted in the selec-

tion and establishment of the effective movement and the elimination of the ineffective movements.

Learning by combination is illustrated by the maze experiment. A rat placed in a maze smells food, and begins a series of searching, exploratory movements. He tries one passage after another, comes up against blind alleys, until he

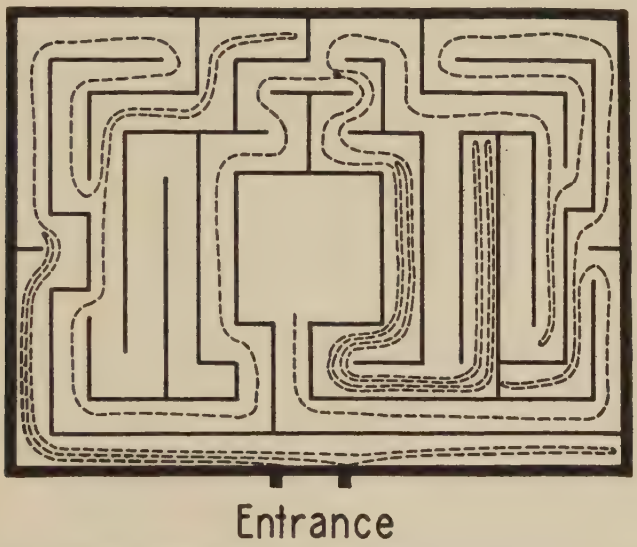


FIG. 18.—A MAZE (FROM HICKS). IN THE CENTER IS THE FOOD BOX. IT TOOK A RAT 4 MINUTES AND 2 SECONDS TO FIND THE CORRECT PATH TO THE FOOD ON THE FOURTH TRIAL. HIS WANDERINGS ARE INDICATED BY THE DOTTED LINE.

gradually discovers the one passage that leads him to the end of his search. After a number of trials he goes straight for his food immediately on being placed in the maze.

Dr. Woodworth gives an excellent account of what happens in this learning process:

The rat, placed in a maze, explores. He sniffs about, goes back and forth, enters every passage, and actually covers every square

inch of the maze at least once; and in the course of these explorations hits upon the food box. Replaced at the starting-point, he proceeds as before, though with more speed and less dallying in the blind alleys. On successive trials he goes less and less deeply into a blind alley, till he finally passes the entrance to it without even turning his head. Thus eliminating the blind alleys one after another, he comes at length to run by a fixed route from start to finish.

At first thought, the elimination of the useless moves seems to tell the whole story of the rat's learning process; but careful study of his behaviour reveals another factor. When the rat approaches a turning point in the maze, his course bends so as to prepare for the turn; he does not simply advance to the turning point and then make the turn, but several steps before he reaches that point are organized or co-ordinated into a sort of unit.

The combination of steps into larger units is shown also by certain variations of the experiment. It is known that the rat makes little use of the sense of sight in learning, guiding himself mostly by the muscle sense. Now if the maze, after being well learned, is altered by shortening one of the straight passages, the rat runs full tilt against the new end of the passage, showing clearly that he was proceeding not step by step, but by *runs* of some length. Another variation of the experiment is to place a rat that has learned a maze down in the midst of it, instead of at the usual starting-point. At first he is lost, and begins exploring, but, hitting on a section of the right path, he gets his cue from the "feel" of it, and races off at full speed to the food box. Now his cue cannot have been any single step or turn, for these would all be too much alike; his cue must have been a familiar sequence of movements, and that *sequence* functions as a unit in calling out the rest of the habitual movement.[1]

Here we have a case quite different from the cat in the puzzle box. The rat did not hit upon the right pathway by

[1] WOODWORTH, R. S., *Psychology: A Study of Mental Life,* Holt, 1921, pp. 305-308.

mere chance which resulted in the elimination of the useless movements, but found it and established it by a successive series of eliminations, each step of the series being a learned act. That is, a habit of avoiding was formed for each blind passage, and the final successful act is the outcome of this successive series of avoidings. In other words, the final habit is a serial combination of a number of habits, and not simply the accidental choice of one movement out of many.

Learning by coördination we have already considered in detail in the chapters on habit and vountary action. In habit formation there is no elimination nor is there serial combination. What takes place is an integration of a number of already existing units of behavior, whether reflexes or habits, into a more complex unit of behavior.

b.—MENTAL LEARNING

In learning by elimination, combination and coördination, motor activity is predominant. The final product of the learning process is modified behavior. In ideational learning mental activity is predominant. The final product of the learning process is a new mental attitude or idea resulting in a new form of behavior. To mental learning belong conditioned learning, perceptual learning, memorial learning, and imaginative learning.

The conditioned response is the simplest form of mental learning. Its result is either that a new stimulus arouses an already existing reaction, or a new reaction is made to an old stimulus. In the first instance we have a substitute stimulus; in the second, a substitute reaction. Fear of lightning is a response to a substitute stimulus. Loving a former enemy is a substitute response. Thunder and lightning are so closely

In other animals learning is predominantly cerebral, as conditioned, perceptual or imaginative

connected as natural phenomena that the effect at first produced only by the auditory stimulus passes over in time to the visual stimulus. The originally effective stimulus becomes linked with an originally ineffective one, so that the ineffective also becomes effective as a result of the linkage. The reaction to lightning is conditioned upon the unconditioned reaction to thunder. Many of our likes and dislikes are results of conditioned and unconditioned learning. Something that is naturally liked or disliked becomes linked with what is naturally somewhat neutral, and the neutral takes on the affective coloring of the non-neutral. A subject in which I am interested suggests connections with a subject in which I am not interested. The result is that the uninteresting becomes interesting. I have learned to like something I was indifferent to. This is the reason why a person who penetrates deeply into any one special branch of knowledge develops before long an interest in knowledge in general, since all branches have a common trunk, of which they are the extensions or outgrowths.

Perceptual and memorial learning belong together, since memory is but an extension of perception. Perception is based upon retention and recognition, while memory is the recall, the bringing back, of what happened in the past in the form of images plus the reference of the images to the past. An image is a percept sans physical external stimulus. A memory is an image plus the conscious reference of the image to a past event—the when, where and how, of its occurrence. Perceptual learning means the strengthening of retention and recognition and the extension and intensification of meaning. I know more about a thing, that is, I have learned more about it, if I recognize it more readily, and if I understand

its meaning more thoroughly and see its implication and relationships more broadly. I know little when my recognition of something is hazy and when its significance is vague and sketchy. Memorial learning means the intensification of recall, so that what happened in the past becomes more available for present use. I have memorized something thoroughly when I can bring it back in its details readily and accurately, and when I am certain as to where, when, and how I learned it.

Imaginative learning is the availability and use of the past and present, of recognition and recall, as raw material for the future. Coleridge learned *The Rime of the Ancient Mariner* in his desultory readings. The inventor learns his invention as he breaks up old relationships and establishes new ones. The composer learns his composition as his mind is everlastingly adventuring in the realm of tone. As we have seen in the chapter on Imagination, creation is not a flash but a process. Each of the steps in the process, from preparation to verification, is an act of learning. The period of illumination is the result of the learning that occurred in preparation and incubation. And the period of verification which follows illumination is a further act of learning. As the creative mind reasons, it learns. And the learning that occurs in verification may be, and most often is, a preparation for another incubation and illumination. Creative learning is thus a continuous process from that which has been learned to that which is to be learned. It is a chain that grows everlastingly longer, each additional link suggesting a succeeding link. The creative mind is therefore in a constant mental stew. It gropes, it finds, and each discovery is but a clue to a further groping. This is the sum and substance of the history of the sciences,

philosophies, arts and religions. The mind is ever seeking light, but it finds only a dim corner which reveals another dark passage that invites exploration. Creative learning repeats everlastingly the ancient query, "but where is wisdom to be found and where is the place of understanding?" And the answer it finds is "always keep on searching and learning." Knowledge comes but wisdom lingers. And it is wisdom that creative learning seeks. And all it ever finds is an invitation to go on seeking. The animal has knowledge, but man must not only know, but understand. This is the price he pays for his superior brain; his reward is that he has been increasingly becoming the ruler of all he surveys and keeps on surveying, and that he is more and more getting to be the master of his fate and the captain of his soul.

III

THE LAWS OF LEARNING

We have several quite definite facts obtained experimentally regarding certain influences which aid or hinder learning, which are known as the laws of learning. These are the law of *effect*, the law of *exercise*, the law of *association*, the law of *diminishing returns* from practice, the law of *interference*, the law of *age*, the law of *incentive*.

The law of effect holds that reactions which are pleasant in effect are more rapidly learned, and are retained longer than reactions whose effect is unpleasant. Satisfying results lead to repeated reactions, and hence to quick learning; while reactions that give annoying results are avoided. The result determines what reactions are to be retained through repe-

The law of effect

tition. Another form of this law, besides satisfying and annoyance, is success and failure. When a reaction is successful in carrying out a certain purpose, the linkage between the reaction and the stimulus is strengthened. When the reaction fails of its purpose the linkage is weakened, the reaction tends to disappear. A perch placed in a tank of water with a minnow and a glass partition between them learns to let the minnow alone even when the partition is removed after having bumped its head against the barrier for about thirty days. Failure caused the elimination of the attack reaction. It may be said that success and failure are really the same as pleasantness and unpleasantness, success being pleasant and failure unpleasant. But this is not always true. Learning to like olives is at first unpleasant, but it is persisted in because it leads to success in liking them. Again, many reactions are persisted in even though a failure, just because of the pleasant results that attend final success. The rat gets no satisfaction from blind alleys. The dissatisfaction intensifies the effort rather than weakens it. The first attempts to learn a new subject are unpleasant, but they are nevertheless persisted in (sometimes) even without outer compulsion. Dr. Thorndike states this law as follows:

> Of several responses made to the same situation, those which are accompanied or closely followed by satisfaction to the animal will, other things being equal, be more firmly connected with the situation, so that when it recurs, they will be more likely to recur; those which are accompanied or closely followed by discomfort to the animal will, other things being equal, have their connections with that situation weakened, so that, when it recurs, they will be less likely to occur. The greater the satisfaction or

discomfort, the greater the strengthening or weakening of the bond.[1]

The law of effect operates, in general, mainly in trial and error learning of both animals and humans.

The law of exercise operates only in improving or strengthening an already existing reaction, and not in the initial formation. The rat begins his learning the maze by the law of effect. But the more often he runs the maze, the more precise and accurate does the reaction become. The law is, then, that when a stimulus arouses a certain reaction for whatever reason, the more the reaction is exercised the greater is the improvement. This law is formulated by Thorndike as follows:

The law of exercise

> Any response to a situation will, other things being equal, be more strongly connected with the situation in proportion to the number of times it has been connected with that situation and to the average vigor and duration of the connections.

The law of use is a phase of the law of exercise. It holds that so long as a reaction established by exercise is used it is retained. If it is disused it deteriorates and gradually disappears. This does not mean, however, that the effect of the exercise is completely eradicated. A skill that has deteriorated as a result of disuse takes less time and effort to relearn than was necessary for its acquiring. The skill acquired on a typewriter in two hundred hours of practice was regained in one hour after a year or so of complete disuse.

The law of use

Many experiments have been conducted to ascertain the rate at which deterioration or forgetting takes place. The problem is difficult since it involves many variable factors.

[1] THORNDIKE, E. L., *Animal Intelligence*, p. 244, copyright, 1911, by The Macmillan Company; reprinted by permission.

The rate of forgetting varies with the degree of thoroughness of learning. It varies for motor and mental learning. It varies for different kinds of material learned, whether it is meaningful or meaningless, or more or less meaningful. The pioneer investigator in this field was Ebbinghaus. He found that in learning a list of nonsense syllables only to the degree of being able to recite them once correctly, 55.8 per cent is forgotten at the end of an hour, and about 75 per cent after six days. If the material is learned more thoroughly, until it can be recited correctly twice, the rate of forgetting decreases. The rate decreases most rapidly at first, after which it slows down more and more until the curve of forgetting reaches a flat stretch or plateau. What this plateau means is uncertain. It may mean that there is nothing more of the learned material left to be forgotten except the recollection that it was once learned. Or it may represent the residue at the end of a certain time when the experiment stopped. Or it may mean that the learned material has sunk to the level of the subconscious.

Experiments do not confirm the popular notion that the rapid learner is also a quick forgetter. If learning means understanding and not only rote recalling, then the reverse is true, namely, that the rapid learner is the long retainer. Material which is so learned that its significance and relationships are quickly and clearly seen, is bound to be retained longer because of its associations than is material which is learned parrot-like. Hence, the person who is quick to grasp the meaning and connections of facts is bound to retain the facts longer than he who has obtained nothing but the bare facts. He forgets quickly because he has little to remember. The very fact that he is a slow learner means that he learns

less thoroughly during a given time and consequently forgets more rapidly than he who has learned more thoroughly in the same period of time. The tortoise got ahead of the hare, not because it went faster but because the hare loafed. The quick learner is more prone to loaf than the slow plodder. Hence the plodder often gets ahead of the runner. But it is not because the plodder gets more through his plodding, but because the runner gets even less by frequently standing still. The plodder knows he has to plod and forms the habit of plodding, and he gets somewhere. The runner knows he does not have to plod, so that, unless he is careful, he forms the habit of loafing, and gets nowhere. It is because of this fact that the notion arose that quick learning is quick forgetting, that easy come is easy go. This may be true of money, but it is not true of mind.

The law of association

The law of association we have already encountered in connection with imagery, where we saw the effect of recency, frequency, intensity, on the flow of ideas. To these three factors of recall we now must add two more as influencing learning. These are contiguity and similarity. Contiguity means that several things or ideas occur together in either time or space. Since they occurred together there is the tendency for them to recur together, so that when one member of the chain recurs it calls up all the others. A number of things occurring together constitute a single situation. I know a poem or a melody not as a number of discrete sounds or tones, but as a single entity. Hence, when one component part of the entity recurs, it evokes all the other component parts. As a law of learning, this means that a number of originally separate elements can be retained as easily as a single element, provided they are combined to form a unit.

Similarity includes likeness and difference or resemblance and contrast. Difference implies comparison. And comparisons can be made only when two things have something in common. The something in common may be an element present in both, absent in both, or absent in one and present in another. When the element is absent or present in both, we have comparison by likeness or resemblance. When it is present in one and absent in the other, we have comparison by difference or contrast. In both instances there is association, a tying together of several things by a common characteristic. As a law of learning this means that the learning process is facilitated and that retention and recall are strengthened if some common factor, either as contrast or resemblance, is established in the material to be learned. Marked contrast or resemblance produces a strong impression, and a strong impression means better retention, recognition, and recall. Something difficult to retain is often quite readily recalled if it is associated with something else already known which is either very much like or very much different from what is to be learned.

The law of diminishing returns concerns the effect on learning of the frequency of practice periods. In learning to play tennis or to swim or to shoot, is it better to practice continuously for three or four hours or to break up the time into periods of practice and of rest? This law holds that, in a given amount of practice, better results are obtained if the practice is distributed over a longer period of time than if it is concentrated into a relatively short period. In an experiment on acquiring skill in archery four groups of sub-

The law of diminishing returns from practice

jects were allowed the same amount of practice, five hundred shots, at the end of which the accuracy for each group was determined. One group shot five times a day, another twelve times per day, the third group twenty times, and the fourth forty times. It was found that the group with the widest distribution of practice periods, namely the one shooting five times a day, could shoot twice to three times as accurately as the group that shot forty times per day, although the initial skill for all groups was the same.

The law of interference states that the less the number of habits being formed at the same time, the more rapidly will each habit be acquired. When a number of things are being learned at the same time, one process interferes with another, and what is known as retroactive inhibition occurs, with the result that little is known about many things and not much about any one thing. This is the case with college education. Before the student has had a chance even to begin to digest one point in a lecture, another is forced on him, until at the end of the day he has a first-class case of mental indigestion. Three groups of animals were trained in three habits. One group was allowed one day for each habit. A second group was required to work on the three habits three times per day. The third group worked on each of the problems five times per day. The group learning one problem a day learned more rapidly than the groups that practiced three and five times per day. Furthermore, the group that learned once per day profited more from each practice period than either of the two other groups. Further experiments tend to show that the law of interference operates only when the habits to be acquired are somewhat identical, and that when

The law of interference

there are no common elements among them there may be actual facilitation instead of inhibition.

According to the law of age, the younger the animal the more rapidly is a habit formed. One hundred rats of four different ages learned a very complex maze. The most youthful group learned in thirty trials, whereas the oldest group required about forty-two trials. This must not be interpreted to mean that the power of learning disappears with increasing age. The notion that one does not learn after thirty is entirely erroneous. There is probably a slight loss in the power to acquire motor skills of certain kinds because of gradual decrease in muscular plasticity. But there is no period when ability to learn is lost. Age can learn fast enough, but youth can learn certain things faster. The tendency of age is to cease trying to learn as soon as school days are over with. Thorndike and his students conducted investigations on the "changes in the amount and changes in the nature of ability to learn from about age fifteen to about forty-five, and especially from age twenty-five to age forty-five." From these studies Thorndike concludes that almost anything is learnable up to fifty years of age. Such activities as swimming and dancing may be more difficult for older people. "Inner growth," however, "gives the person from twenty-five to forty-five, a better ability than he had from fifteen to twenty, and a much better ability than he had from five to fifteen." Whereas the child can learn some things better than the adult, the adult can learn more things better than the child. All that is needed is a willingness and a desire to learn. Age may be an excuse. It is never a justification or a barrier.

The law of age

The law of incentive was considered in some detail in connection with voluntary action. Incentive is an urge or

The law of incentive

drive for attainment. If the drive is a compulsion, coming from the outside, it is not as effective as when it is an impulsion, a desire. What constitutes most effective incentives for growth and effort is the big problem confronting the home, school, church, and other social institutions. School practices are constantly being modified in the attempt to make learning desirable. Business is introducing numerous innovations in organization and equipment, to provide the worker with an incentive for more and better labor output. And the church is resorting to numerous devices, not excluding advertising, to increase attendance and devotion. The vocational guidance movement in education and personnel management in industry, are attempts to strike at the very root of the problem by determining individual aptitudes and thereby providing the only finally effective incentive, a worker happy in his work because he is fitted for it.

CHAPTER XIV

PERSONALITY

Questions this chapter seeks to answer: What is personality as a whole? What are its constituent elements? What is individuality, self, character, and the relationship between them? Is personality subject to cultivation, and how? What is meant by a personality trait? What is the value of an inventory of traits? What is meant by a personality type? What is a normal personality? What is an abnormal personality?

PERSONALITY is the organized system, the functioning whole or unity, of habits, disposition, and sentiments that mark any one member of a group as being different from any other member of the same group. If all members of any one social group acted alike, thought alike, and felt alike, personality would not exist. All human beings are alike in that all possess certain physical, mental and emotional traits in common, which label them as being human beings. But they are unlike in their likeness in that the common traits do not occur as duplicates but as variations. All human beings have eyes, ears, hands, legs, a certain shape and form, but all eyes, ears, etc., are not alike. There is likeness in *kinds* of traits possessed, but unlikeness in the *degree* to which the common traits are present in different persons. This difference in degree is the basis of personality. In order to see,

Personality is a social product

therefore, what is involved in personality, we must inquire as to the sources of these differences in degree, the effects these differences produce on mind and behavior, and how the totality of the differences functions within a given group. The differences themselves we shall call *individuality*; the effect of the differences on mind, we shall term the *self*; the effect of the self on behavior we shall designate as *character*; and the product of character, *personality*. Individuality produces self, self gives rise to character, and character is evaluated as personality.

I

INDIVIDUALITY

Individuality is inborn

In the chapters on Habit and Perception we saw how the same situation calls forth different experiences and reactions in two persons, due not only to differences in environmental conditions but primarily and basically because of differences in native structural make-up. The sum total of these inborn differences constitutes individuality. Very soon after birth we readily discern differences in infants not only in their physical features, but also in their behavior, in that some are quite noticeably more wide-awake, alert and active than are others. The environment develops these structural variations for the weal or woe of the infant, but it does not create them. Structural differences are at least four-fold: sensory, neural, muscular, and visceral, giving rise to differences in intelligence, in aptitude, and in temperament. And some sense organs, brains, muscles, and visceral organs are of fine or poorer material than are others. The differences run all the way down and up the scale from very superior material to

very inferior material, from a genius to an idiot. Living material is as varied in quality as is non-living material. There is silk tissue and cotton tissue in life as there is in matter; and while a skilled workman may turn out an excellent product of cotton, and a clumsy workman make a botch of silk, the cotton product will never equal that of silk if the two materials are handled with equal skill. These variations in quality of living materials exist not only between persons, but are found also in the same person. It is possible for one to have a superior brain, muscles that are clumsy and visceral activity that is sluggish. It is but rarely that all factors of the same, or even similar, quality are found together in one individual.

II

THE SELF

Self is individuality become aware of itself. It is the consciousness of being different. And, like all consciousness, self-consciousness begins in vagueness and chaos and only gradually becomes clear and distinct. In other words, self is a form of knowledge, the result of experience, and goes through all the stages of knowledge, from sensation through perception to creative imagination. One is not born with a knowledge of self any more than one is born with a knowledge of anything else. The child has no knowledge of self at birth, but achieves this knowledge as it achieves other knowledge. And this knowledge begins as a stream of vague sensations out of which there gradually emerges definite order. But we must approach the analysis of the nature and significance of the self rather cautiously for two reasons:

Self is a form of knowledge

first, because of the vast importance that the self occupies in human life; and second, because of the mystery in which the self has been shrouded by theology and metaphysics. We must see whence this importance of the self, and why the mystery, before we attempt to place it in its proper psychological realm.

It has been well said that the self is "the living center around which the chief interests gather, from which the principal energies and activities proceed, and in terms of which the leading valuations are made."[1] Certainly, if there is one thing that a person prizes and stresses above anything else, it is his selfhood. He protests against its violation, he struggles for its recognition, and he strives for its full realization. The spirit of liberty is the spirit of the self; for the struggle of the ages for political and religious freedom, freedom of thought and speech, has its roots in the soil of self. Remove self from human consciousness, and there remains nothing to struggle for except bare physical existence, and man is reduced to the status of the animal. Without self-consciousness, man's attainments in the sciences, arts, philosophies and religions, his cultural heritage, would be effaced from his record. Man has sought knowledge of his objective world for the sake of his fuller subjective world, for his knowledge of the objective world has meaning only in relation to his inner world. No greater compliment can be paid a man than to say of him that he is a real self, whereas he recognizes that to seek to be true to himself—to *his self*—is, as Plato called it, the virtue of virtues. We pay tribute to the self whenever we use the word "duty," for duty

[1] TRACY, FREDERICK, *The Psychology of Adolescence,* The Macmillan Company, 1920, p. 119.

has no meaning unless it is someone's duty, my duty or his duty. In religion the self is predominant, for the essence of religion, as we have seen, is the relation of a finite self to an infinite supreme self. It is supreme in education, since the goal of education, we insist, is self-development. In a work of art we prize the self-expression embodied in it, while science is the attempt of the self to conquer the non-self through which it operates.

The reason for the mystery surrounding the nature of the self is not far to seek. I know my self as being distinct from what is not my self. But what is it that I know when I know my self, and what is the *I* that knows? There is a *known* and a *knower*. What is the *known*, as distinct from the *knower*? How can *I*, who know, also know the *I* that knows? In other words, every experience is the experience of some self, belongs to a self. Experiences do not happen *in vacuo*. They happen to someone. If experiences occur to an experient, the experient cannot possibly be the result of experience. The self is therefore something that has experiences, but is itself not an experience. But what, then, is it? The attempt to answer this question has led metaphysicians and theologians, in the words of William James, "to postulate behind the passing state of consciousness a permanent substance or agent whose modification or act it is. This agent is the Thinker; the 'state' is only its instrument or means. 'Soul,' 'transcendental Ego,' 'Spirit,' are so many names for this more permanent sort of Thinker."[1]

It is not a mystery

Such a conception of the self may be interesting, but it is hardly illuminating. It is primitive, mystifying, spiritistic. It removes the self from the realm of scientific study. And,

[1] *Psychology* (advanced course), vol. i, p. 196.

Mystery due to wrong conception of consciousness

what is more important for our purpose, it is based upon an entirely erroneous conception of the nature of mind, or consciousness. Consciousness, as we have seen in the discussion on the nervous system, is not a state in which things *occur*, but is itself an *occurring*. Mind is not some mysterious substance or entity in which experiences happen. It is the happenings themselves. If there were no happenings there would be no mind. Things do not happen *in* consciousness, but the happenings *constitute* the consciousness of any given moment. The processes that are now occurring in my brain as I write these words are my consciousness at this particular instant. They do not happen in my mind. They are my mind. There is therefore no *knower* which, or who, does the *knowing*. The *knower*, the *knowing*, and the *known* are one and the same. Consciousness is an activity and not a state of receptivity. There is no agent that does the thinking but, once more to quote William James, "the thoughts themselves are the thinkers." We do not *have* thoughts. Thoughts happen or occur in us as brain processes; and the occurrences, the processes, are the thinker. Consciousness is not a vessel which contains experiences, or a medium in which experiences happen, or an agent which thinks, but *is* the experience, the happening, the thinking. Without these there would be no consciousness. Without thinking there could be no thinker. Without experiences there could be no experient.

Applying the above considerations on the nature of consciousness to our problem as to the nature of self, we return to our first statement, namely, that self is a form of knowledge, the knowedge of being different, and all the consequences attending this knowledge. And this knowledge arises, as does all knowledge, from sensation through perception to imagi-

nation. We must therefore consider three phases in the development of self-knowledge, or three aspects of the self, which we shall call, respectively, the *sensory* self, the *perceptual* self, and the *imaginative* self. And since all sensation is sensation of something, perception is perception of something, and imagination is imagination of something, our problem is to inquire: What is the sensory self sensation of? What is the perceptual self perception of? What is the imaginative self imagination of?

Self-consciousness is, like all consciousness, a development from sensation to imagination

Considered in the light of the nature of mind, our answer to the first question, What is the sensory self sensation of? must be that just as the subject becomes aware of, or attains knowledge of, an object as object, so it also attains awareness of itself as subject, and that it attains knowledge of itself as subject in and during the process of attaining knowledge of objects as objects. We have seen that all knowledge begins with a process of differentiation during which a complex of sensations become integrated into a distinct object. Similarly, the knowledge of self begins with a process in the course of which a complex of sensations becomes integrated into a system, an entity, *me*, as distinct from other entities which are *not me*. The source of these integrated *me* sensations is threefold.

Self-knowledge begins as sensory experience

The first source is the sensations the child gets from its body through its exteroceptors. The child sees, hears, touches its body as it does other bodies. At first it draws no distinction between the sensations obtained from its own body and those from other bodies. Gradually, however, because of some unique attributes and qualities of the bodily sensations, such a distinction begins to be made. For instance, touching his own body gives a different feeling from touching other

bodies. Scratching or pinching his hands or feet is quite a different matter from scratching his toy. Dropping something on his leg gives a different effect from dropping it on the bed. Hence he gradually learns to distinguish between that which belongs to him as part of himself, and that which does not belong to him as part of something else.

And then there are the intimate, organic sensations, such as hunger, thirst, and pain. These are most unique. They are always with us, awake or asleep. We are always conscious of them, even if vaguely at times. We can shut out sensations from other bodies, but not from our own. Hence we come to refer these sensations peculiarly to ourselves. They can be referred to nothing else. Hence these sensations get to be *me*, and other sensations *not me*.

Finally, we must also take into account the fact of adjustment to the environment as a factor in the genesis of self-consciousness. The business of adjustment generates just those psychological processes whose coloring is most intimate, namely, thoughts and emotions. Every adjustment involves a certain amount of conflict, difficulties to be overcome. Thought and emotion are problem-solving processes. They arise only when there is a pressing situation to be conquered. And since there is nothing more personal than our thoughts and emotions, in that at no time are we more conscious of our own self, our own needs, desires, and wishes, than when we encounter an obstruction, it is probably thought and emotion that form the capstone of the citadel of self-consciousness. The probability becomes a fair certainty when we remember that at no period of life is self-consciousness more intense than during adolescence, the age of storm and stress, when feeling and ideation are at white heat.

But the above is only part of the story of the sensory self. My most intimate self is always my bodily self. This bodily self is what I refer to as being *me*. But the *me* expands to include the *mine*, so that everything that I can ultimately call *mine* is assimilated with the *me*. The *mine* is the expanded, enlarged self, including one's clothes, family, business relations, race, religion, and all other alliances and allegiances that are formed in the course of social adjustment. Whatever a person is "touchy" about, whatever puts him on the defensive, whatever he is ready to defend and fight for, is, in the large, his self. Thus it happens that in the course of the growth of the self a stage is reached when the bodily aspect of the self assumes a secondary rôle, while the expanded self becomes the predominant force in life. Men have willingly, even joyously, submitted their bodies to torture, and even forfeited their lives, for their country, for their God, for what they conceived to be the truth, and for their ideals.

Before proceeding to the perceptual phase of self-consciousness, we must take note of the fact that this consciousness is in a state of constant fluctuation. I am not always the same self even to myself, and certainly not to other selves. At times I like myself, and at times I detest myself. At one time I compliment myself, at another I scold myself. Now I am gay, now depressed, now gentle, now almost violent. And I show as many selves to others as there are persons who know me. I am criticized and I am praised, I am liked and I am disliked. Are there then many selves, or only one self? The answer is that all these selves that I know and others know are surface variations and fluctuations of one basic self. The sources of the variation are fourfold. In the first place, I have moods which are in a constant flux. But beneath the flux

The number of selves and the self

there is a constant factor, my temperament, and my temperament is my constant self, of which the moods are the temporary modifications. Secondly, when I am judged differently by different persons, it is not I who possess the numerous selves that I am taken to be; it is rather the other selves who judge me by their own self. They project their self into me and find that I am different. I therefore become a different self for every person with whom I come in touch. Thirdly, the self is always growing and therefore presents numerous stages of its growth. But all this growth is from inside out, from a seed to roots, trunk and branches, all forming a unit. Fourthly, since the exigencies of life are manifold and demand satisfaction, the various traits of the self play different rôles under different conditions. Sometimes one trait predominates, sometimes another. And for the time being, the predominant trait becomes the self. Hence there are as many selves as there are traits. But the various traits are not the self, but only its varied manifestations. They are the overtones of a fundamental self. All the selves, therefore, that I and others know, are but the surface ripples and waves of a basic undercurrent, of a self that is deep rooted in the very warp and woof of individuality. There is a self in each of us which remains constant beneath the ebb and flow of the transient selves, a self of selves. In some of us the selves predominate; in others, the self. Hence there are persons who have no mooring, who float and flounder in the maelstrom of life. They have no depth, no foundation, but are swayed by the winds and currents of circumstances. They are everybody and therefore nobody. They are everything and consequently nothing. On the other hand, we have persons whose life and activities are oriented around a center core of selfhood. Their

past, present, and future form a consistent sequence, a growth toward a single goal. The many selves are irradiations of a center self. Hence, while it is true that on the surface the self appears as a multitude of selves, the normal person is nevertheless a unit inner self, of which the many outward selves are the component parts.

In brief, we have found the self to be, thus far, in its most elementary aspect, a complex of peripheral and organic sensations. But sensation is not knowledge, but its beginning, its raw material. Sensations, as we have seen, become knowledge only when, as a result of experience, they become differentiated, separated out, into distinct wholes, and interpreted as *meaning* and *value*. The meaning lies in the behavior that the system of differentiated sensations provokes, while the value arises from the affective tone of the behavior, as being pleasant or unpleasant. The process of differentiation and interpretation we call perception. Consequently the vague sensory self becomes real only when it reaches the perceptual stage of mental development. We must now consider the nature of this perceptual self. And here we have two questions to consider: (1) Of what is the perceptual self an interpretation? (2) What is the nature and significance of the interpretation?

In seeking an answer to the first question, let us remind ourselves that interpretation is personal and relative. That is, all interpretation is, in the first place, *my* interpretation, the meaning and value to *me* of something that is not *me*. There must be object and subject if there is to be an interpretation, since the object has a meaning and a value only to a subject. The object is interpreted in terms of the subject. How, then, does a perceptual self arise when there is no

The sensory self becomes a social or perceptual self

object to interpret, when subject and object are one? To say that the perceptual self is the interpretation of the sensory self is to imply that the subject interprets subject, that the self derives meaning and value from the self. Such an answer brings us back to a mysterious, non-experiential self, that is, to theology and metaphysics, which we cannot allow psychologically. The alternate answer is that the self projects itself into space and thereby becomes an object which it interprets. And the answer sounds plausible and probable when we consider the everyday fact that we feel and think about our self, we obtain pain and pleasure from our self, we like and dislike our self, we disprove and approve of our self, we scold and compliment our self, and so forth and so on—in other words, that we treat our self as we treat any other sensory entity, as an objective existence. But we are still involved in mystery. How does this projection, this objectification of the self take place? Where is the self projected, and how? Where does it exist as an object? Psychologically this projected self must be subject to sensory experience in order to be interpreted. We cannot interpret a ghostly phantom, a shadowy nothing.

Here we find a plausible answer in the second trait of perception, namely, its relativity. I never interpret an object in isolation, in a vacuum, but in relation to some other object or objects. A chair I interpret not only in terms of myself, as an object to sit on, and as pleasant or unpleasant to sit on, but also in relation to a table, food, etc. Each object is interpreted in its bearing upon other objects which together fulfill a certain function and are therefore similar to one another. They have something in common, they are different but alike, or alike in difference. Now from the very beginning of its

existence the child is surrounded by other persons; its own self comes in contact with other selves. They act like itself, talk like itself, enjoy the same things, are hurt by the same things, desire the same things; hence others are its own self and its self is others. It identifies its own self with others and others with its own self. Its self is projected into others and thereby its self becomes an objective existence. In fact, this projection is primitive and elemental. In its earliest stages of growth the child identifies itself with others, draws no distinction between other persons and its own person. Its earliest self-experience is objective. The subjective stage, when the child differentiates its own person from others, is a later development. Thus the very consciousness of difference is rooted in likeness, for difference means contrast, and contrast must be in terms of reference to others. "The development of the child's personality," writes Professor Baldwin, "could not go on at all without the constant modification of his sense of himself by suggestions from others. So he himself, at every stage, is really in part some one else, even in his own thought of himself."[1] And Dr. McDougall claims that "the normal human being, if it were possible for him to grow up from birth onward in a purely physical environment, deprived, that is to say, of both animal and human companionship, would develop but a very crude and rudimentary idea of the self."

The perceptual self is therefore essentially and primarily a social self. It is the consciousness of being different from other persons, just as the sensory self is the awareness of being different, in general, from other objects. But the social self

[1] BALDWIN, J. M., *Social and Ethical Interpretation,* The Macmillan Company, 1906, p. 241.

depends upon the bodily self as perception depends upon sensation. So we may define the perceptual self as being the interpretation of the sensory self in terms of, and in relationship to, other selves, in whom the sensory self is objectified.

Thus far we have only covered the problem as to what the perceptual self is perception *of*. We still have the question before us regarding the content of the interpretation. Our cue here is the statement made previously, that the perceptual self is the consciousness of difference in likeness. The child is born into a social environment from which it obtains its repertoire of habits and ideas. Yet, because of his individuality, his habits and ideas have a unique coloring. He does what others do, but differently. He is occupied with the ideas of other persons, but he finds that there is a clash in conclusions reached. It is in these overtones of action and idea that he finds his uniqueness as a person, and which becomes his living, functioning, social self. As he grows older these overtones become more marked in degree and enlarged in scope, which means that his social self-consciousness increases. He is not only distinct from others as a body, but also distinctive in his functioning and position in the group. He has a world in which he lives, and which is his own creation. When all is well with this world he is happy or, at least, contented. When all is not well he feels restrained, curbed, and he is restless or even miserable. What conditions must be satisfied if all is to be well? First of all, he must have congenial work, work suited to his talents, in which he feels at home, comfortable, and in which he can express himself, of which he can be proud, and which is getting him somewhere. Otherwise his self-esteem suffers. Next, he must have recognition from others; his distinctiveness must be recognized and re-

The social self seeks maintenance, recognition, and realization in the social group

spected by the group. He must be somebody, not anybody. He cannot respect himself unless he commands the respect of others. In the words of William James:

> We are not only gregarious animals, liking to be in sight of our fellows, but we have an innate propensity to get ourselves noticed, and noticed favorably, by our kind. No more fiendish punishment could be devised, were such a thing physically possible, than that one should be turned loose in society and remain absolutely unnoticed by all the members thereof. If no one turned round when we entered, answered when we spoke, or minded what we did, but if every person we met "cut us dead," and acted as if we were non-existing things, a kind of rage and impotent despair would ere long well up in us, from which the cruelest bodily tortures would be a relief; for these would make us feel that, however bad might be our plight, we had not sunk to such a depth as to be unworthy of attention at all.[1]

And the philosopher John Locke writes:

> He who imagines commendation and disgrace not to be strong motives on men . . . seems little skilled in the nature and history of mankind; the greatest part whereof he shall find to govern themselves chiefly, if not solely, by this law of fashion; and so they do that which keeps them in reputation with their company, little regard the laws of God or the magistrate. The penalties that attend the breach of God's laws some, nay, most, men seldom seriously reflect on; and amongst those that do, many, whilst they break the laws entertain thoughts of future reconciliation, and making their peace for such breaches: and as to the punishments due from the laws of the commonwealth, they frequently flatter themselves with the hope of impunity. But no man escapes the punishment of their censure and dislike who offends against the fashion and opinion of the company he keeps, and would recommend himself to. Nor is there one in ten thou-

[1] *Psychology* (advanced course), vol. i, p. 293.

sand who is stiff and insensible enough to bear up under the constant disgrace and disrepute with his own particular society. Solitude many men have sought and been reconciled to; but nobody that has the least thought or sense of a man about him can live in society under the constant dislike and ill opinion of his familiars and those he converses with. This is a burden too heavy for human sufferance: and he must be made up of irreconcilable contradictions who can take pleasure in company and yet be insensible of contempt and disgrace from his companions.[1]

Then he must have the fullest, freest, and widest scope for growth and development, for self-realization. He must feel that he is the captain of his soul and the master of his fate. Unless he has that feeling to a certain degree he is liable to revolt, to evolve some sort of compensatory traits, or defense mechanisms, or to rationalize his situation or, in extreme forms, to develop some such abnormality as a double personality. We may therefore say that the meaning and value of the social self is to maintain its personal identity among other selves, to command recognition from other selves, and to operate fully and freely in a constantly widening environment.

In the same sense that imagination is the pinnacle of mental experience, the imaginative self is the ripest fruit of the root, trunk, and branches of the sensory and perceptual selves. The imaginative self is an ideal, potential self. It is a pure self and stands as a contrast, a challenge and beacon light to the actually functioning, impure and vacillating perceptual self. When the ideal self is vivid and clear, its influence on the person is tremendous. It is a source of constant, irresistible and tireless striving. The ideal becomes the real, the worthy, the desirable, while the actual is its shadow and contamination.

[1] *Essays*, book ii, chap. xxviii, par. 12.

The actual, concretely existing, objective self, is the self that is to be immediately preserved, the self that struggles with the immediately present environment for its maintenance, the self that seeks food, shelter, material possessions, social recognition, that is elated at transient successes and depressed at temporary failure, the self that weeps and laughs, loves and hates, works and rests, sleeps, eats, and plays. The ideal self is the self to be attained, to seek and strive for, that reveals the daily self in all its sordidness and transitoriness. The actual self is the self as it is; the ideal self is the self as it might be and as it ought to be. It is this vision of a potential self that we probably call spirit or soul, because of its intangibility, mystery, ethereal quality, yet possessing a very significant reality in the influence that it exerts upon the actual self, spurring it on toward constant attainment. The ideal self is probably also responsible for the idea of conscience, for whenever we see ourselves as we actually are, and also as we might be, we feel a shortcoming which is painful and harassing. The measure in which the ideal self serves as a spur, a drive, depends upon its vividness. The more vivid that it is the more real it is, and the degree of its reality determines the influence that it exerts. In the religious genius we find this ideal self in its most inclusive, perfect, all-encompassing and real form, as God. Hence the tremendous earnestness, seriousness and relentlessness that we find in the prophets and saints, and their vehement denunciations of everything that is out of harmony with this vision. We find it also in such social visionaries as Plato, and the builders of Utopias to whom the concept of the brotherhood of man, the selfhood of mankind, is an ideal reality. We find it in the artist who strives to embody an ideal self in some artistic medium, and

The imaginative self is the ideal, potential self

we find it in a less permanent form in the lover who, in the first flush of his infatuation, sees in the beloved an ideal which Plato describes in such glorious imagery in the *Phædrus*. To a lesser degree this ideal self functions more or less constantly in the life of every normal person. There is no normal human being who, at times, does not experience with Browning:

There are flashes struck from midnights, there are fire-flames noondays kindle,
Whereby piled-up honors perish, whereby swollen ambitions dwindle;
While just this or that poor impulse, which for once had play unstifled,
Seems the sole work of a lifetime that away the rest have trifled.

III

CHARACTER AND PERSONALITY

It is the striving to make a work of art of life that we call character. The figure is not at all fanciful. Art means the skillful manipulation of tools and materials for the fashioning of a product that was imaginatively conceived. Similarly, character means the discriminate use of life's tools and materials for the building of personality, that is, the realization in the actual of the imaginatively conceived, ideal self. Character is therefore the self in action, the self in the process of cultivation in some social medium, the product of which process, at any particular stage of achievement, is personality. The personality grows as the character is strengthened, as the self becomes more vivid, and greater effort is exerted in its cultivation. Character then means perseverance in the build-

ing of personality, in the cultivation of selfhood. The nature of the character depends on the quality of the self that is being cultivated and the degree of energy exercised in its cultivation. Weakness of character is the failure to cultivate the self. Strength of character is the persistent discriminating pursuit of a true self. Badness of character is the persistent pursuit of a false self in an indiscriminate manner. And the manner is indiscriminate because the notion of self is false and distorted. There is character among thieves as among saints. The difference lies in the self that is being cultivated and therefore also in the personality that is produced.

Character is the self in cultivation, personality in the making

If character is the process of self-cultivation, the art of personality building, what is the nature of the process, and what are its tools and materials? We have already answered this question in the chapter on Voluntary Action. There we saw that the substance of voluntary action is control of the present for the sake of the future, the marshaling and directing of present activity toward some imaginatively conceived end. It is in such activity that we recognize the presence of *will*, and we designate the person who is engaged in the activity as possessing character. Character is therefore the intelligent control of behavior, the dominance of will over desire. Desire is the impulse of the moment. Will is the pursuit of the future. The impulse of the moment is the actual; the pursuit of the future is the ideal. Hence character reduces itself to a process of behavior or activity in which the ideal self predominates over the actual self. If we call the pursuit of the ideal self, *selfness*, and the preoccupation with the actual self, *selfishness*, then character is definable as selfishness striving toward selfness. In other words, where there is control of immediate desire for the sake of a

future end that has been intelligently conceived, character is present and personality is in the making. When, however, the impulses of the moment are the ruling powers of a person's conduct, regardless of consequences to himself and others, and when such submission becomes a ruling passion, a fixed habit, we say that the person has no character, no strength, no control. He is a slave to his actual self. He does not pursue, he submits. He really has no basic self or, rather, his basic self is submerged and lost beneath the clatter and conflicting claims of his transient selves. On the other hand, when there is control and regulation of the selves by the basic self, there is selfness. *Character is therefore the predominance of selfness over selfishness.* And since there are levels of selfness, or degrees to which the basic self rules over the surface selves, we have degrees of character. At the lowest level is the character who is a victim to passing fancies and impulses and who will use any means at his disposal to satisfy them. The drug addict is such a character. At the highest level are the great personages of the ages whom we honor for their persistent pursuit of an ideal in spite of suffering and temptation of wealth and position.

There are many hazards in the social judgment of character and personality. Characters that are often judged strong may be quite weak, while characters pronounced weak are often the strong. Take cowardliness and courage as a case in point. Cowardliness is commonly a sign of weakness, while courage indicates strength. But the two may be deceptive. What appears as cowardliness may be strength, representing control, while courage may be at times nothing more than rashness and irresponsibility. To rob a bank takes courage,

Character is often misjudged

while turning the other cheek is taken for cowardice. But there is no doubt as to which of these is a desirable character. In both robber and idealist there is persistency of effort. But the robber is controlled, while the idealist controls. The one practices selfishness while the other pursues selfness. Socially, the one is desirable while the other is undesirable. There is really no strength in the robber, while the idealist is all strength. A strong character is therefore one in which the persistency of effort is due to selfness, while a weak character is dominated by selfishness. It is altogether a question as to the self whose realization is sought. This self may be true or false. It is true when in harmony with a natural normal outgrowth of individuality. Gossiping, misrepresenting, beating around the bush, rationalizing, we recognize as being bad habits. These acts are a departure from the normal development of individuality. They are false notes in a natural harmony. Instead of being indications of a normal development of the seed of individuality, they represent its abortions and distortions. They are indications of selfishness, in that they yield momentary satisfaction, but they do not represent selfness, in that they do not build personality but distort it. Selfness consists of all those acts that belong inherently to basic individuality. We recognize these inherent qualities whenever we say that a certain act was not true to our real self. The persistent pursuit of such inherent acts constitutes strength of character, and its product is a noble personality. Weakness or lack of character is the failure to pursue and persist in such acts. Socially, whenever the behavior is in harmony with selfness the judgment of the group in which the character is cultivating itself is in favor of the person.

IV

TRAITS AND TYPES OF PERSONALITY

An inventory is a stock-taking of human characteristics

Several attempts have been made within recent years to analyze out the single traits which together constitute personality as a whole, and to group personalities into several types in accordance with some one outstanding general trait. The value of both the trait survey and the type classification lies primarily in showing the rôle that each trait plays in adequate social functioning, and the distortions that any one trait may be subject to.

a.—PERSONALITY TRAITS

There are quite a few inventories which differ in the number of traits given and in the relative importance assigned to any one or several traits, depending on the purpose the inventory is intended to serve. The following general inventory, which was devised for practical use in psychiatric cases, gives an idea of the scope of trait analysis.

A psychiatric inventory

I. Preferred Reactions and Intellectual Activity
   - A. Reactions which tend to gauge the facility for acquisition
   - B. Estimation of retention
   - C. Reactions which tend to gauge the ability to coordinate and utilize experience
   - D. Reactions which tend to gauge the sense of reality

II. Preferred Reactions and Somatic Demands
   - A. Reactions in response to minor somatic demands
   - B. Reactions which tend to gauge the inclinations to motor and psychomotor experience
   - C. Demands more or less closely related to sex interest

III. Preferred Reactions and Self Estimate

A. Reactions which tend to reveal the presence or absence of a feeling of insecurity
B. Reactions which tend to show the breadth of influence of a feeling of insecurity
    1. Reactions in social adaptation
    2. Mood reactions
C. Reactions which tend to reveal the intensity and some morbid effects of a feeling of insecurity

IV. Preferred Reactions and Adaptation Imperative

A. Reactions which tend to gauge the tendency to a constructive assertion of this imperative
B. Reactions which tend to gauge the tendency to a para-constructive assertion of this imperative

Each of the above headings includes a number of specific reactions from which an estimate is made of the persons standing in the particular trait. For instance, the sense of reality is gauged by the following items:

Is the subject matter-of-fact? Does he take things as they are or as he wishes they might be?
Is he clear or vague of purpose? Visionary?
Does he appear to realise that success depends upon genuine effort?
Is he inclined to become absent-minded or absorbed?
Is his attention capricious?
Is he inventive?
Is he artistic? Does he lose himself in his indulgence in art?
Has he a good sense of responsibility?
Is he imaginative?
Is he inclined to indulge in contemplation or revery?
Does he day-dream?
Does he indulge in fantasies?
Is he superstitious?

Does he sleep well?
Does he dream much? Does he have night terrors?
Does he walk in his sleep?
Has he a good sense of right and wrong?
Is he truthful? Details, if not.
Does he give shrewd, deceitful, plausible explanations?
Does he lie to gain a well-defined purpose?
Is he dishonest?
Is he shrewd, foolish, or wanton in his dishonesty?
Is he clear of purpose in his dishonesty?
Is he cruel?
Is he easily led by others?[1]

Dr. F. H. Allport gives an inventory based on "the typical adjustments of the individual to his environment."

An adaptability inventory

1. Intelligence
   - Problem-solving Ability
   - Memory and Learning Ability
   - Perceptual Ability
   - Constructive Imagination
   - Special Abilities
   - Soundness of Judgment
   - General Adaptability

2. Motility
   - Hyperkinesis-Hypokinesis
   - Impulsion-Inhibition (Control)
   - Tenacity
   - Skill
   - Style

3. Temperament
   - Emotional Frequency and Change
   - Emotional Breadth

[1] AMSDEN, GEORGE S., *A Guide to the Descriptive Study of the Personality*, Bloomingdale Hospital Press, pp. 3, 7.

Emotional Strength
Characteristic Mood
Emotional Attitude

4. Self-expression
   Drive
   Compensation
   Extroversion-Introversion
   Insight
   Ascendance-Submission
   Expansion-Reclusion

5. Socialty
   Susceptibility to Social Stimulation
   Socialization-Self-seeking (Aggression)
   Social Participation
   Character [1]

Dr. Watson offers the following suggestions for the practical study of personality:

General Survey of Instinctive and Emotional Equipment and Attitude

Do the number and variety of drives to activity seem plentiful or deficient? Are there special lines of activity in which he takes training easily and in which retention is good? Does he display a normal amount of investigatory behavior (curiosity) with respect to new situations, systems of thought, literature? Has he any knack of doing things with his hands? manipulation? Does he use or substitute this knack of doing things for card playing, dancing, golf and other recreation outlets? What particular bents and hobbies has he exhibited from time to time? What is the history of his early (pre-adolescent) sex enlightenment, sex attachments, and curiosities? Are there any instinctive traits especially with regard to eliminative and sex functions yet un-

A general inventory

[1] *Social Psychology*, 1924, p. 103; reprinted by permission of and special arrangement with Houghton Mifflin Co.

socialized, such for example as general bodily display, display of parts, lack of sex fixation, etc.?

Are his emotional reactions well balanced or is he over- or under-emotional; liable to be easily upset, becoming angry or violent or unduly retiring when certain topics are under discussion or when in the presence of certain situations? If so, what situations most easily arouse emotional activity both of the primitive type, such as fears, rages, love, etc., and the more systematized and adult type which takes the form of attitudes? Have there been strong attachments or antagonisms for any member of the family? Have these been outgrown or have they been carried over into adult life? Would he be classed now, or was he so classed as a boy, as a sissy; was he as a lad ever taunted with being tied to his mother's apron string? How many infantile emotional reactions and attitudes have been carried over into adult life, such as biting the nails, playing with the mouth and face, spitting? What outlets does his more organized emotional life take, *e.g.*, day dreaming, making or writing or fanciful productions?

General Habits of Work

Does he complete work undertaken promptly and neatly, or is he a procrastinator, a maker of excuses and in general a temperamental worker? Is he punctual at his tasks and appointments? When stuck on a given task does he give up easily with signs of emotional disturbance or does he as a rule work persistently until the difficulties are overcome? Does he work to his limit or is there a constant tendency to save himself? In leaving his work is he one of the first to drop his task or will he work later than regulations specify? Is he adverse to having extra duties put upon him? Must his duties be laid out for him by rule of thumb or need one give him only general outlines? Would you classify him as being resourceful or merely as a doer of chores and routine? Did he as boy or man ever build, design or plan any new object or write an original production? What has been

the history of his vocational endeavors and achievements and what have his earnings been (or its equivalent in rank) at different ages? Is he fixed upon his present level of attainment or is he making steady or rapid progress? If not making progress, is his work suited to his attainments? Would he work better in another line, or would he rise from his present level of attainment if his responsibilities were greater and if he had more difficulties to contend with?

Activity Level

Would you characterize the subject as being lazy, industrious, or active in manual work? Is he talkative or taciturn, slow or active in speech? Is he a story teller or extemporaneous speaker? Are his acts or speech ever violent or rude? Is he given to sudden bursts of loud conversation and frequent laughter? Are his work and talk systematic and logical in character? Are his movements made in good form or is he awkward in gait, work, and speech? Would you characterize him as being a man always in a hurry, restless, eager? Is he constantly talking of the many things he has to do or that he has left undone? Can he put his work aside or must he take it with him, conversationally at least, into his social life and moments of recreation?

Social Adaptability

Does he get along well with his wife, parents or members of his immediate family, with his business associates, with his companions in recreation? What is his history with respect to association with others? How many intimate friends has he among his own and the opposite sex? Of how long standing (carried from infancy or formed in later life)? How easily does he get acquainted with people when in a new environment? How rapidly does he become settled in a new environment? How would you rate him with respect to tactfulness, quarrelsomeness, co-operation, etc.? Apart from any money or social status that he may possess, is his society sought by others? Is he in general loyal

to his friends and does he make active efforts to hold them? Has he had any history of leading men? What position of prominence in games, sports or social life has he held?

Recreation and Sports

What are the main types of his play activities and how successful has he been in them? Is he of the one-sport type (*i.e.*, possessing a single hobby, such as golf, poker) or is he an all-round sportsman? Does he sacrifice his work and responsibility to exercise his recreation and sporting tendencies? Are there special forms of play, especially of chance such as cards and roulette, which amount to obsessions and toward which he displays a lack of balance?

Organized Sex Life

Will he talk freely of his sex life when questioned about it for scientific purposes or does he avoid reference to this phase of his life or to certain periods of it? Has he a tendency to talk too freely about his sex experiences and to be boastful of his conquests? Obtain from him as careful a statement as possible of the chief events in his sex life and the effect they have had upon his life history. Include here the adolescent struggle, the transition to heterosexual fixation, his infatuations and the like. Does he attribute his success or lack of success to any of these factors?

If married, what has been the history of the relationship? Is he affectionate and kind, or jealous, irritable and fault-finding? Is he domineering or submissive? Does prudishness, frigidity or avoidance mark the relationship? Has there been any tendency toward perversion in any form, cruelty, etc.? Does he show any peculiarities with respect to certain foods and odors? Have children been sought? Has any home life been established? Do husband and wife have the same friends and play the same games or are they held together merely by social pressure or the joint responsibility of children?

Reactions to Conventional Standards

As judged by ordinary standards (and with special reference to the group in which he lives), is he truthful, faithful to his word, and careful of the rights and reputation of others? Is he frank in his opinions and statements, trustworthy in money matters or the reverse? Put specifically to him such questions as whether under any circumstances it is ever justifiable to tell a lie, to steal, to cheat, to fall in love with an engaged or married woman and tell her about it? To kill another individual or to commit suicide?

Personal Bias and Peculiarities

Has his early home, school or religious training implanted fixed modes of reacting which are not in line with his present environment—that is, is he easily shocked, for example, at seeing a woman smoke, drink a cocktail or flirt with a man; at card playing; at the fact that many of his associates do not go to church? Have past failures in early home life, married or business life developed a "soured" disposition or attitude? Has he become a woman hater, a rebel against social law and order, and in general a misogamist, or does his general restlessness at failure take another form in which he actually attaches himself to each new movement in thought or in philosophy, religion, art, music, politics? Has the early petting or cruelty he has received at the hands of interested individuals made him boastful, timid, proud, overbearing; or is he generally balanced in these respects? Examine him especially with reference to his brooding and sensitiveness. What are his chief lines of sensitiveness and how does this sensitiveness show itself? In shutting himself off and putting up a barrier against social contact or in complaints that every hand is against him? How in general have his disappointments and successes left him so far as new undertakings are concerned?

Are there peculiarities in voice, gesture, gait, physical appearance, defects or weaknesses in organs which arouse emotion when he is forced to face them? Have these been adjusted to and

compensated for to such an extent that he will talk with you freely about them, or have they developed within him a permanent inferiority attitude with many peculiarities in behavior developed to compensate for such weaknesses? Is he over-meticulous with reference to dirt, money matters and peccadilloes generally? Would you classify the individual as being foppish and overdressed; does he resort to beauty treatments, perfumery, etc.? Is he lavish in his expenditures, exhibiting a tendency to show off; or is he miserly and close?

Balancing Factors

How in general has he reacted to difficulties which could not be overcome? Does renunciation merely leave him unadjusted or does he attain readjustment by turning to other activities without loss of time and without serious emotional breakdown? What has been the history of some specific readjustment after loss, for example, of position, parent, friend, sweetheart, wife or child? In general has he found satisfactory substitutes and balances for things given up and lost and for weaknesses of training and poor special equipment? For example, if he never learned to play, what does he substitute for this? If he has never married, what factors compensate? If married but with no children, what compensations have been made (pets, adoption of other children, etc.)? How do his unbalanced tendencies show: in recklessness, excesses, speed manias, the seeking of exciting situations, excessive eating, dress, etc.? Can he resort to game, music, theatre, dancing, and to club life when in trouble or when family relationships bid fair to remain unsatisfactory? Has he engrossing work which serves him as a balance wheel and for compensation when other things go wrong? What verbal account can he give of the things he has substituted for the things he cannot obtain,—for example, one man constantly makes a poor score in golf, but he prides himself on having better "form" than any other member belonging to the club. Money suddenly acquired is often a balancing or compensating factor for lack

of breeding and social position. A woman lacking beauty of face preens herself over her form, or lacking both, upon her hair, or even upon the size of her feet or the shape of her hand. Lack of special recognition and position of a given family is compensated for by the fact that they are relatives of some person of recognized ability and attainment.

Have religion and church work been for him a balancing factor—one upon which he loads responsibility and from which he receives authority and by means of which he obtains surcease from emotional strain in times of trouble? Would you classify him in general as one who put his responsibilities and troubles upon the Lord or upon himself? [1]

b.—TYPES OF PERSONALITY

A type classification may be concerned with either normal personalities or abnormal personalities. By a type is meant nothing more than the prominence of some one trait in some one person which is present in somewhat lesser degree in other persons. All human beings possess the same traits, but some traits are more marked in some persons than in others. The types are not exclusive of each other, but inclusive.

Normal Types.—The most ancient classification on record is that of Aristotle, who mentions four temperamental types: choleric, melancholic, sanguine, and phlegmatic. Dr. Morgan [2] considers four aspects of personality, *intellectual, emotional, kinetic, social*. Under each aspect he has several types. There is the compensatory intellectual who seeks in mental accomplishment solace for physical deficiency, compensation for some affection failure, as disappointment over love, or the hiding of social failure. The visionary intellectual engages

Temperamental types

[1] WATSON, JOHN B., *Psychology from the Standpoint of a Behaviorist*, Lippincott, 1919, pp. 399-404.

[2] MORGAN, J. J. B., *op. cit.*, pp. 373-391.

in phantasies as a substitute for failure or adjustment to environment. Besides these intellectual types, there is the curious intellectual, the exhibitionist intellectual, the cynical intellectual, and the balanced intellectual. The emotional types are the self-centered individual, the homosexual, the emotionally uncontrolled, the emotionally repressed, the irritable, the anxious, the dare-devil, the suspicious, and the æsthetic. Classification according to energy gives the hypokinetic, or inactive, and the hyperkinetic, or the overactive. The social reaction types are the introvert and the extravert. The introvert is self-centered, with a tendency to brood and to feel isolated. The extravert is other-centered in the extreme. He is the hail-well-met-go-getter. More generally he seeks the company of others, and does not concern himself much with what others think of him; he is a fighter and does not run away from unpleasant situations, and he is more influenced in his thinking, interests and activities by other people than by purely personal factors.

Psychological types

The Swiss psychoanalyst, C. G. Jung, gives a classification on the basis of psychological functions, as *thinking, feeling, sensation,* and *intuition*. When one of these functions prevails habitually it gives rise to a type. He traces these four groups in poetry, psychiatry, philosophy, biography and æsthetics. Dr. Jung writes as follows:

> The conscious psyche is an adaptation—or orientation—apparatus, consisting of a number of psychic functions. As such fundamental functions one can designate *sensation, thinking, feeling* and *intuition*. Under the heading *sensation*, I wish to include all apperception by means of sense organs; by *thinking* I understand the function of intellectual cognition and the forming of logical conclusions; *feeling* is a function of subjective evaluation, and

intuition I hold to be apperception by an unconscious method, or the perception of an unconscious content.

These four fundamental functions appear to me, as far as my experience reaches, to be sufficient to express and represent the ways and means of conscious orientation. For a complete orientation of consciousness all the functions should co-operate equally; thinking should make cognition and the forming of judgments possible; feeling should say to us how and in what way a thing is important or unimportant for us; sensation by means of sight, hearing, taste, etc., should enable us to perceive concrete reality; and finally intuition should permit us to guess the more or less hidden possibilities and backgrounds of a situation, because these hidden factors also belong to a complete picture of a given moment. But in reality it is seldom or never that these fundamental functions are uniformly developed and correspondingly under voluntary control. As a rule one or the other function is in the foreground, while the others remain in the background quite undifferentiated. Thus there are many people who restrict themselves chiefly to a simple perception of concrete reality, without reflecting much about it or taking into account the feeling values involved. They bother themselves little about the possibilities which lie hidden in a situation. Such people I describe as "sensation" types. Others are exclusively influenced by what they think and simply cannot adapt themselves to a situation which they cannot comprehend intellectually. I designate such people "thinking" types. Again there are others who are guided in everything wholly by their feelings. They merely ask themselves if something is pleasant or the reverse, and orientate themselves by their feeling impressions. These are the "feeling" types. Finally, "intuitives" concern themselves neither with ideas nor with feeling reactions, nor yet with the reality of things, but give themselves up wholly to the lure of possibilities and abandon every situation where no further possibilities are scented.

These types then present a different kind of one-sidedness, but one which is complicated in a peculiar way with the generally extraverted and introverted attitudes. Just on account of this

complication I was forced to mention the existence of these function types, and bearing it in mind, let us return to the question outlined above, *viz.,* the one-sidedness of the extraverted and introverted attitudes. This one-sidedness would indeed lead to a complete loss of balance if it were not psychically compensated by an unconscious counterposition. The investigation of the unconscious has revealed the fact, for example, that in the case of an introvert, together with his conscious attitude, there is an unconscious extraverted attitude which automatically compensates his conscious one-sidedness.[1]

Endocrine types

A somewhat fanciful grouping is given by Dr. Berman on the basis of the endocrine glands. Berman says: "The internal secretion formula of an individual may, in the future, constitute his measurement which will place him accurately in the social system." He gives therefore the pituitary, the thyroid, the thymus, the sex, and the adrenal types.

If the bodily economy is dominated by the secretion of the anterior pituitary gland we have, according to Berman, the masculine masterful domineering type; with the posterior dominating, the feminine imaginative artistic type. With a deficiency in anterior pituitary we get lethargy, indolence; with deficiency of the secretion of the posterior pituitary, coarseness and lack of imagination. Energy is supplied by sufficiency of thyroid secretion, while an excess causes restlessness, lack of control, and excessive emotionality. Thyroid deficiency gives the inert individual or, if extreme, one form of feeblemindedness. The thymus gland is the gland of childhood; if it persists in adult life we have persisting infantile qualities, such, for instance, as homosexuality. The sex glands determine maleness and femaleness, physical and mental. The adrenal glands, when properly functioning, endow the individual with endurance, vigor; when deficient in functioning cause lack of vitality, neurasthenia.

Out of these possibilities Berman constructs his personality

[1] JUNG, C. G., in "Problems of Personality" (*Studies in Honor of Dr. Morton Prince*), Harcourt, Brace, 1927, pp. 297-298.

types, choosing as illustrations historic characters. Cæsar is chosen as showing a most extraordinary balance in differing aspects of personality as an outcome of his endocrinal or glandular formula, which was determined by the excellent functioning of all the glands. Napoleon is cited as a pituitary-centered individual, ante-pituitary superior, post-pituitary inferior, with an instability of both that led to his final degeneration. The Little Corporal's pugnacity, animality, and practical genius argued for a superb adrenal; and his insatiable energy pointed to an excellent thyroid. Darwin is said to have lived the life of a hyperfunctioning pituitary, with, in addition, thyroid excess and adrenal deficiency, a combination "settling the fate of a grand intellect in an invalid."[1]

Abnormal Types.—We have already considered disturbances of personality in previous chapters in the sections on abnormalities of different mental and motor functions and of emotion.

Personality is disturbed when one trait becomes so dominant in either its presence or its absence that it completely overshadows, at least temporarily, all other traits, thereby disrupting the balanced unity. The case is similar to an article of food in which there is either too much or too little of one ingredient. In eating it one tastes nothing but that ingredient. Each normal personality type becomes abnormal when one or more of its distinguishing traits become overstressed or understressed. The genius as well as the lunatic are therefore abnormal persons, one supernormal, the other subnormal. The difference between the two is that genius is constructive, builds for the future, while the lunatic is destructive of that which already exists. The genius is super-adaptable, the lunatic is non-adaptable. The one is social, the other asocial. One is an asset, the other a liability.

Abnormal persons are either subnormal or supernormal

[1] DOWNEY, JUNE E., *The Will-Temperament and Its Testing*, pp. 18-19, copyright 1923 by The World Book Company, Yonkers.

From his experiences with psychiatric patients, Dr. Aaron Rosanoff gives four types of abnormal personalities, each of whom is an exaggerated form of a normal function.[1]

Antisocial personality, or persons given over to malingering, pathological lying, swindling, and the pursuit of certain criminal careers.

Cyclothymic personality, or individuals whose life is a constant series of emotional ups and downs. There are four varieties of this personality, designated as manic, depressive, irascible, and emotional.

They acquire, as a rule, but scant education, with gaps and unevenness, as they show no perseverance in their studies, are disinclined to make an effort, are distractible in an unusual degree, and seek all sorts of ways to escape from the constraint of a systematic mental culture, in order to carry on instead all possible rapidly changing secondary activities. The emotional tone of

Manic

these patients is persistently elated, care-free, self-confident.—Towards others they are overbearing, arbitrary, impatient, insolent, defiant.—They are given for the most part to jests, including self-ridicule, chatting, pastimes and all manner of pranks. Now and then, however, appear transient moods of anxiety or sadness.—They are approachable, communicative, adapt themselves readily to new situations, but quickly begin to long again for a change.—They are fond of picturesque, showy dress, wear a fez, or neglect their appearance, run around bedraggled and dirty. Their conversation is quick and animated; they talk readily and abundantly, are quick at repartee, never hesitate for an answer, even though the answer might be but a threadbare pretense.—Their writings are verbose, prolix, pompous, full of personal remarks, forced witticisms, offensive invectives.—Many patients join, with quickly weakening zeal, newly appearing movements, become enthusiastic vegetarians, anti-vaccinationists, antisemites,

[1] ROSANOFF, AARON J. (ed.) *Manual of Psychiatry*, John Wiley & Sons, 1927, pp. 333-338.

sportsmen, bathe in wintry cold; others develop into mountebanks, professional buffoons, town characters. Characteristic for some cases is a planlessness of procedure which shows plainly how little the internal pressure of activity is directed by rational deliberation. —With their environment these patients are often in constant conflict. They mix into everything, overstep their prerogatives, make unauthorized arrangements.—As they prove themselves everywhere useless, these patients generally fall into economic ruin. When their means are exhausted they begin to borrow, manage by means of promissory notes, commit stock-corporation frauds, swindle. Their great hopes for the future, an almost finished invention, hint of an appointment, acquaintanceship with persons of high position, the prospect of a rich marriage, an assumed title, are made to serve to raise their credit.—The mildest forms of this disturbance lead us toward certain make-ups of personality which are in the domain of the normal. Here we deal with brilliant but unevenly endowed individuals with artistic inclinations. They delight us with their nimbleness of spirit, their versatility, their multiplicity of ideas, their alert open-mindedness and spirit of enterprise, their artistic ability, their kind-heartedness, their gay, sunny disposition.

There exists in these patients from youth a special sensitiveness to the cares, troubles, and disappointments of life. They take all things hard and feel the little unpleasantnesses in every occurrence much more strongly than the elevating and gratifying aspects of unconcerned and happy enjoyment, of unreserved surrender to the future.—Every task stands before them like a mountain; life, all activity is a burden which they usually bear with a conscientious self-denial and without the compensation of the pleasure of living, the joy of creating.—They despair at every task, readily become anxious and despondent, feel they are useless in the world, unfit for anything, nervous, ill, fear an attack of some severe disease, especially a mental disease or a brain disease.—They lack self-confidence, decision, seek the advice of others on the slightest occasions.—Owing to their timidity these patients never come

Depressive

to a quick decision. They spend endless time in weighing and considering without accomplishing anything.—Many patients play constantly with suicidal thoughts and are always prepared to give up their life at the next occasion.—Often these patients are harassed by all sorts of nervous troubles. They feel tired, broken up, complain of giddiness and dull pressure in the head, unpleasant sensations in various parts of the body, oppressions, palpitations, tremblings, pulsations, twitching vibrations.—The stomach often presents the manifestations of nervous dyspepsia.—Of the greatest significance is the fact that the fundamental state of depression can be quite suddenly interrupted by manic attacks, that it is, indeed, not infrequently the basis on which the clinical picture of "periodic mania" develops. Even more frequently occurs the alternation of manic and depressive attacks.

These patients show from youth an extraordinarily fluctuating emotional equilibrium and are strongly affected by all experiences, often in an unpleasant way.—They are easily offended, hotheaded, and on trivial occasions become enraged and give way to boundless outbursts of anger.—It comes then to violent scenes with scolding, yelling, and tendency to assaults. One patient in such a fit of rage threw a whole pile of plates on the floor, hurled the burning lamp at her husband, then tried to attack him with the shears.—The emotional coloring is subject to various changes. Ordinarily the patients are, perhaps, serene, self-assertive, ill-controlled; periods, however, intervene in which they are cross and sullen, also perhaps unhappy, dejected, anxious, cry without cause, express suicidal thoughts, make hypochondriacal complaints, and go to bed.

Irascible

It is seen in those persons who consistently swing back and forth between two opposite poles of emotion, now "shouting with joy to heaven," now "grieved to death." Today lively, sparkling, radiant, full of the joy of life, enterprise, and action, they meet us after awhile depressed, listless, dejected, feeling the need of rest, only to show again several months later the former liveliness and elasticity.

Emotional

Autistic personality, or shut-in individuals, who are mainly preoccupied with their own ruminations and pay little attention to what goes on in the outside world.

Persons who do not have a natural tendency to be open and to get into contact with the environment, who are reticent, seclusive, who cannot adapt themselves to situations, who are hard to influence, often sensitive and stubborn, but the latter more in a passive than an active way. They show little interest in what goes on, often do not participate in the pleasures, cares, and pursuits of those about them; although often sensitive they do not let others know what their conflicts are; they do not unburden their minds, are shy, and have a tendency to live in a world of fancies. Autistic

Epileptic personality, or individuals marked by violent likes and dislikes, "seizures," ecstasies, inspirations, impulsiveness, heightened feeling of self and craving for self-expression, uncompromising tenacity of purpose and endless patience, and inconsistencies of conduct. The epileptic is a most complex and interesting personality. He occupies a prominent position in the history of civilization as ruler, religious leader, reformer, crusader, and literary man. The Russian novelist Dostoyevski is an outstanding case of an epileptic in literature, and his novels abound in scenes and descriptions of epileptic behavior and phenomena without equal in medical annals. Thus, in *The Demons* he writes: Epileptic

There are moments—and it is only a matter of five or six seconds—when you suddenly feel the presence of the eternal harmony. This phenomenon is neither terrestrial nor celestial, but it is an indescribable something, which man, in his mortal body, can scarcely endure—he must either undergo a physical transformation or die. It is a clear and indisputable feeling: all at once, you feel as though you were placed in contact with the

whole nature, and you say, "Yes! this is true." When God created the world, He said, at the end of every day of creation. "Yes! this is true! this is good!"—And it is not tenderness, nor yet joy. You do not forgive anything, because there is nothing to forgive. Neither do you love—no! this feeling is higher than love! The terrible thing is the frightful clearness with which it manifests itself, and the rapture with which it fills you. If this state were to last more than five seconds, the soul could not endure it, and would have to disappear. During these five seconds, I live a whole human existence, and for that I would give my whole life and not think I was paying too dearly.

An outstanding trait of an epileptic is his susceptibility to fits or convulsions.

Among the scores of cases I have been privileged to see almost daily for years, I have learned to detect with almost unfailing certainty—through noting temperamental changes alone, the moment the patient enters the room and begins to speak—the approach of a convulsion a few hours or even days in advance of the convulsive period. An almost imperceptible change in personality has been wrought. The patient is querulous, fussy, fault-finding, nothing goes right; trifles that ordinarily produce no effect on him now completely engage his attention. His friends ignore him, his family is indifferent to his needs and his condition, his fellow-patients are no longer congenial, their attacks disturb him, he cannot endure their jocose remarks, distorting them into expressions of ridicule. Finally these ideas may persist in their growth, looming up larger and larger on the horizon of a morbidly heated mind, until they pass into qualified delusions, all being dependent upon the subtle, pernicious, autocratic influence of the approaching attack, and all completely disappearing, as if by magic, after the attack is over. In some cases, as we have stated, these ill-humor periods begin a day or so only before the fit, in others they come on weeks before, while in still other rare instances they come and go, without the occurrence of a seizure, being, as it were, a long-drawn-out, silently discharging seizure—a fit without a climax.

CHAPTER XV

THE MEASUREMENT OF PERSONALITY

Questions dealt with in this chapter: What is a test? What is an intelligence test? What is its value? How is it used? What is an aptitude test? How is such a test constructed? What is it used for? What is the purpose of a character test? What does it reveal?

For years psychologists have been laboring to devise some reliable means, some psychological yardsticks, that would measure individual differences in personality traits. Such a psychological yardstick is known as a test. An immense amount of searching and experimenting along this line has been going on for some time, and many sins of omission and commission are enacted in the name of psychological measurements. But any movement whose purpose it is to discover what a human personality is, and what conditions, subjective or objective, help or hinder its full development and functioning, is to be commended and encouraged. Of all persons, the psychologist is most suspicious and wary of the value and reliability of any test he devises. But he is searching, investigating, and he has already found much that is of great value when judiciously applied. Today we have some fairly reliable means for measuring general aptitude, called intelligence tests; for special aptitudes, or talent tests; tests for emotional stability, and tests for revealing one's interests, beliefs, and social attitudes.

I

SOME SAMPLE TESTS

Below are sample excerpts from tests intended to measure the following traits: 1. Emotionality or Emotional Stability; 2. Likes and Dislikes; 3. Moral Judgment; 4. Social Intelligence; 5. Sociability; 6. Interests and Beliefs. Let us give these tests to ourselves in order to get a first-hand impression of what a test is like before we proceed to discuss the theory of testing. It takes an expert to interpret the results of a test so we must draw no conclusions from what we are about to do. Our purpose here is simply to see what an actual test is like.

Emotionality [1]

In front of each question you will find: yes no ?

Draw a ring around one of these three answers for each question. try to answer by "yes" or "no" if it is possible. If you are entirely unable to say even a tentative "yes" or "no" to the question, then draw a ring around the question mark.

yes no ? As a child did you like to play alone?
yes no ? Do you usually control your temper?
yes no ? Do you get stage fright?
yes no ? Have your relationships with your mother always been pleasant?
yes no ? Do you think people regard you as rather careful about your personal appearance?
yes no ? Are you troubled much by constipation?
yes no ? Can you work better when there are other people around?
yes no ? Do you feel that life is a great burden?

[1] Used by courtesy of Dr. L. L. Thurstone.

yes no ? Are you more interested in ideas than in people?
yes no ? Have you ever had the habit of stuttering?
yes no ? Do you get on well with your brothers and sisters?
yes no ? Do people regard you as extremely systematic?
yes no ? Does your heart sometimes sound in your ears so that you cannot sleep?
yes no ? Do you take responsibility for introducing people at a party?
yes no ? Do you think most people are self-seeking or malicious?
yes no ? Do you find it difficult to get rid of a salesman?
yes no ? Do you have difficulty in starting conversation with a stranger?
yes no ? Do you lose your head easily in a dangerous situation?
yes no ? Did you ever have the habit of biting your fingernails?
yes no ? Do you laugh easily?
yes no ? Do you worry too long over humiliating experiences?
yes no ? Are you careful not to say things to hurt people's feelings?
yes no ? Are you sometimes the leader at a social affair?
yes no ? Are your day-dreams about improbable occurrences?
yes no ? Do you like to be alone when you work?
yes no ? Do you usually get turned around in new places?
yes no ? Do you often feel lonesome, even when you are with other people?
yes no ? Do you love your father more than your mother?
yes no ? Do you consider yourself a rather nervous person?
yes no ? Are you afraid of falling when you are on a high place?
yes no ? Do you resent strict discipline?
yes no ? Are you interested in meeting a lot of different kinds of people?

yes no ? Do you usually let other people do the talking?
yes no ? Do a great many things frighten you?
yes no ? Have you ever had a nervous breakdown?
yes no ? Are your feelings easily hurt?
yes no ? Are you easily shocked by sexual topics, *risqué* stories, and the like?
yes no ? Do you keep in the background on social occasions?
yes no ? Do ideas often run through your head so that you cannot sleep?
yes no ? As a rule do you prefer to work out a thing for yourself?
yes no ? Do you have the habit of leaving a lot of tasks unfinished?
yes no ? Have you found books more interesting than people?
yes no ? Is a good story spoiled for you if it is not well written?
yes no ? Are you conservative about dress?
yes no ? Are you frequently bothered by indigestion?
yes no ? Are you ever bothered by a feeling that things are not real?
yes no ? Are there many people that you dislike intensely?
yes no ? Do you ever feel an awful pressure in or about the head?
yes no ? Are you usually cool and composed in a dangerous situation?
yes no ? Are you frequently burdened by a sense of remorse?
yes no ? Do people think you are selfish?
yes no ? Does it upset you to lose in a competitive game?
yes no ? Can you sit still without fidgeting?
yes no ? Do you usually trust people?
yes no ? Do you lose your temper quickly?
yes no ? Is your mother's nature usually cheerful?
yes no ? Have you ever held any school or class office?
yes no ? Do you get rattled easily?

yes no ? Do you worry over possible misfortunes?
yes no ? Do you usually feel fatigued when you wake up in the morning?
yes no ? Can you stand disgusting smells?
yes no ? Do you avoid arguments?
yes no ? Do you ever talk in your sleep?
yes no ? Does it make you uneasy to go into a tunnel or subway?
yes no ? Do your feelings alternate between happiness and sadness without apparent reason?
yes no ? Are you quick in movement?
yes no ? Are you often afraid of contracting disease?
yes no ? Do you get tired of amusements quickly?
yes no ? Are you frequently worried about religion?
yes no ? Have you ever had an arm or leg paralyzed?
yes no ? Are you troubled with shyness?
yes no ? Have you ever been afraid of going insane?
yes no ? Do you like indoor sports better than outdoor sports?
yes no ? Did you ever have St. Vitus' dance?
yes no ? Do you have a tender feeling toward a good many things?
yes no ? Do people find fault with you more than you deserve?
yes no ? Do you find it necessary to watch your health carefully?
yes no ? Are you often frightened in the middle of the night?
yes no ? Do you like to take the lead in social conversation?
yes no ? Does it make you uneasy to sit in a small room with the door shut?
yes no ? Are you unenthusiastic about your life's possibilities?
yes no ? Have you ever seen a vision?
yes no ? Are you frank and outspoken?

yes no ? Do you often have bad pains in any part of your body?
yes no ? Do you know of anybody who is trying to do you harm?
yes no ? Have you ever been afraid that you are sexually inferior to other men (other women)?
yes no ? Were your parents partial to any of your brothers or sisters?
yes no ? If you come late to a meeting would you rather stand or leave than take a front seat?
yes no ? Did you ever have a strong desire to commit suicide?
yes no ? Do you sometimes re-write social letters?
yes no ? Do you tend to nonconformity in your political, religious, and social beliefs?
yes no ? Have boys ever made love to you?
yes no ? Do you like outdoor sports better than indoor sports?
yes no ? Do you day-dream frequently?
yes no ? Did you have a happy childhood?
yes no ? Have you occasionally had to resist an impulse to take things that were not yours?
yes no ? Have you ever been afraid that you might jump off when you were on a high place?
yes no ? Were you your parents' favorite child?
yes no ? Have you ever had spells of dizziness?
yes no ? Do you get discouraged easily?
yes no ? Do you often say things on the spur of the moment and then regret them?
yes no ? Have your relationships with your father always been pleasant?
yes no ? Do you have a great many bad headaches?
yes no ? Is there anyone you want to get even with?
yes no ? Does it make you uneasy to cross a bridge over a river?
yes no ? Do your interests change quickly?

yes no ? Are you regarded as particular about details?
yes no ? Did you ever have a strong desire to run away from home?
yes no ? Did you ever have convulsions?
yes no ? Can you stand pain quietly?
yes no ? Do you like to argue?
yes no ? Do you like to be by yourself a great deal?
yes no ? Are you easily moved to tears?
yes no ? Do you express yourself better in speech than in writing?
yes no ? Do you have difficulty in concentrating because of having girls (boys) on your mind?
yes no ? Do you allow people to crowd ahead in line?
yes no ? Are you creative of new and sometimes eccentric ideas and things?
yes no ? Do you dread the sight of a snake?
yes no ? Do you like outdoor life?
yes no ? Did you ever have heart trouble?
yes no ? Does it bother you to have people watch you at work even when you do it well?
yes no ? Do you limit your friendships mostly to your own sex?
yes no ? Do you like to take on responsibilities?
yes no ? Have you ever felt as if someone were hypnotizing you and making you act against your will?
yes no ? Can you stand criticism without feeling hurt?
yes no ? Do you have difficulty in making friends?

2

Likes and Dislikes[1]

Cross out one of the letters after each of the items below, as follows:

Cross out L if you like the item or are interested in it.
Cross out D if you dislike the item, or if it bores you.

[1] Used by courtesy of Dr. C. S. Yoakum.

Cross out O if you have no decided feelings toward the item.
Cross out U if the item is absolutely unknown to you.

You may be in doubt in some cases. Use your own judgment, always checking the letters in the way which expresses your most frequent attitude.

If you like the item very much or dislike it very much, draw a circle around the proper letter in addition to crossing it out.

Fat men	L	D	O	U
Fat women	L	D	O	U
Thin men	L	D	O	U
Thin women	L	D	O	U
Tall men	L	D	O	U
Tall women	L	D	O	U
Short men	L	D	O	U
Short women	L	D	O	U
Blondes	L	D	O	U
Brunettes	L	D	O	U
Very old people	L	D	O	U
Children	L	D	O	U
Cripples	L	D	O	U
Side-show freaks	L	D	O	U
People with gold teeth	L	D	O	U
People with receding foreheads	L	D	O	U
People with protruding jaws	L	D	O	U
Chinless people	L	D	O	U
People with hooked noses	L	D	O	U
Cross-eyed people	L	D	O	U
Blind people	L	D	O	U
Deaf mutes	L	D	O	U
Feeble people	L	D	O	U
People whose eyes are set close together	L	D	O	U
Men who wear beards	L	D	O	U
Bow-legged people	L	D	O	U
Self-conscious people	L	D	O	U

People who are slow in making decisions ..... L D O U
Very polite people ..... L D O U
Progressive people ..... L D O U
Conservative people ..... L D O U
Energetic people ..... L D O U
Absent-minded people ..... L D O U
People who disagree with you ..... L D O U
People more intelligent than you ..... L D O U
People less intelligent than you ..... L D O U
People who borrow things ..... L D O U
Quick-tempered people ..... L D O U
Optimists ..... L D O U
Pessimists ..... L D O U
People who forgive very quickly ..... L D O U
Grudge-holders ..... L D O U
People who tend to assume leadership ..... L D O U
People who are easily led ..... L D O U
Jealous people ..... L D O U
Conceited people ..... L D O U
People who have made fortunes in business ..... L D O U
Forgetful people ..... L D O U
Emotional people ..... L D O U
Thrifty people ..... L D O U
Spendthrifts ..... L D O U
Stingy people ..... L D O U
Talkative people ..... L D O U
Religious people ..... L D O U
Irreligious people ..... L D O U
People who have done you favors ..... L D O U
People for whom you have done favors ..... L D O U
People who get rattled easily ..... L D O U
Witty people ..... L D O U
Educated people ..... L D O U
Immoral people ..... L D O U
Cautious people ..... L D O U
Sick people ..... L D O U

People who have no sense of humor	L	D	O	U
Nervous people	L	D	O	U
People who always agree with you	L	D	O	U
People who talk very loud	L	D	O	U
People who talk very low	L	D	O	U
People who talk very fast	L	D	O	U
People who talk very slow	L	D	O	U
People who usually talk about themselves	L	D	O	U
Methodical people	L	D	O	U
Fashionably dressed people	L	D	O	U
Carelessly dressed people	L	D	O	U
Southerners	L	D	O	U
New Englanders	L	D	O	U
Westerners	L	D	O	U
Golf	L	D	O	U
Fishing	L	D	O	U
Professional baseball	L	D	O	U
Tennis	L	D	O	U
Swimming	L	D	O	U
Football	L	D	O	U
Driving an automobile	L	D	O	U
Taking long walks	L	D	O	U
Checkers	L	D	O	U
Poker	L	D	O	U
Solitaire	L	D	O	U
Billiards	L	D	O	U
Dancing	L	D	O	U
Summer resorts	L	D	O	U
Amusement parks	L	D	O	U
Picnics	L	D	O	U
Excursions	L	D	O	U
Smokers	L	D	O	U
Conventions	L	D	O	U
Sporting pages	L	D	O	U

Love stories	L	D	O	U
Detective stories	L	D	O	U
"Life"	L	D	O	U
"Literary Digest"	L	D	O	U
"New Republic"	L	D	O	U
"System"	L	D	O	U
"National Geographic Magazine"	L	D	O	U
"American Magazine"	L	D	O	U
"Popular Mechanics"	L	D	O	U
Charlie Chaplin	L	D	O	U
Mary Pickford	L	D	O	U
Wm. S. Hart	L	D	O	U
Cowboy movies	L	D	O	U
Educational movies	L	D	O	U
Travel movies	L	D	O	U
Vaudeville	L	D	O	U
Musical comedy	L	D	O	U
Listening to a story	L	D	O	U
Telling a story	L	D	O	U
Being the butt of a joke	L	D	O	U
Arguing	L	D	O	U
Interviews	L	D	O	U
Making a speech before a crowd	L	D	O	U
Opening a conversation with a stranger	L	D	O	U
Being left to yourself	L	D	O	U
Teaching	L	D	O	U
Organizing a play	L	D	O	U
Living in the city	L	D	O	U
Living in the country	L	D	O	U

3

Moral Judgment[1]

On the inside pages there are several stories. Each story is followed by two questions. Read both questions and put a cross (X)

[1] Used by courtesy of Dr. J. U. Yarborough.

after the one that answers what you would have done if you had been the person named in the story.

The Browns have a large cherry tree. Fully one-fourth of its many branches stretch over the fence and yard of the Smiths who live next door. This summer the tree is full of bright red cherries. Last week little James Smith came into the house and asked his mother when they were going to have a cherry pie. He told her the cherries were ripe and that the best ones were on their side of the fence. Mrs. Smith explained to the boy that the tree belonged to the Browns and that the fruit must be left untouched. James heard a man say it was the law that you could pick fruit from the branches which hang over your property. What would you have done?

1. Allowed the fruit to spoil unless it was given to you?
2. Picked all that hung from the branches on your side of the fence?

When the conductor collected fares this morning he missed Alan Jones who occupied a seat at the end of the car. The boy was going into town to look for a job and he had just enough money in his pocket to pay his fare one way. He would have to walk home if he handed the money to the conductor upon leaving the car. Once before the same thing had happened and the man had been angry when told he had failed to collect a fare. He was afraid that an inspector was on the car and that the fact would be noted and reported. Alan did not want to walk home. Also, he did not want to make the conductor angry. What would you have done?

1. Paid fare; angered the conductor and walked home?
2. Not paid fare; ridden home and avoided trouble?

The class had been in the park all day on a picnic. Coming home Alice and Tom were together. As they passed the rose garden Alice asked Tom if he was afraid to pick a rose for her. Of course Tom said "No," but just the same he glanced around

to see if a policeman was in sight. No one was looking, but still he hesitated. His parents and teachers had often told him that flowers in the park were not to be picked. Alice was watching him and soon she said, "You are afraid. I know you are. I just dare you to pick that flower!" She pointed to a rosebud almost on a level with Tom's hand. He had been accused of cowardice and he had been dared. What would you have done?

1. Picked the flower and proved you were not afraid?
2. Refused to pick the flower and risked the scorn of Alice?

Sarah Redden's mother was desperately ill and her father was in the lumber camp in the mountains. He could be reached only by letter, as no telephone or telegraph lines ran to the place. It was nearly midnight when she sealed the letter in which she urged her father to return home as quickly as possible. She searched for a postage stamp but soon discovered there was none in the house. No post office was open at that time of night and the letter had to be in the next collection. Suddenly she remembered that on a letter she had received that morning, the stamp had not been canceled. If she could remove it and paste it on her letter it could be posted in time. She found the old letter and looked at the stamp for a long time. It would be so easy, but she knew she was thinking of committing a crime against the government. What would you have done?

1. Refused to use the stamp and failed to mail the important letter in time?
2. Used the stamp and run the risk of detection?

Very slowly, almost without his having noticed the change, John Gray had lost faith in the religion of his people. He was alarmed and agitated when he realized how far he had drifted away. Also, he felt that he could never retrace his steps. His employer was a man whose religious principles were unquestioned. He would have no one in his employ who was not a regular attendant at church and a professed believer. Gray was the sole support of his aged father and mother. His only income was earned at his daily

work. If his employer knew of his changed views he would be discharged, and new jobs were hard to find. If his aged parents learned of his loss of faith they would not understand. What would you have done?

1. Played the hypocrite and regularly attended church, carefully observing all the outward forms of religion?
2. Withdrawn from the church, lost your job, pained your parents and lost the esteem of your friends?

Miss Truitt is a college graduate who cannot believe that a big fish swallowed Jonah. She also doubts that a man could live for three days as Jonah is reported to have done. As a Sunday School teacher of a class of small boys, she is doubtful of the course she should pursue. Should she teach her class that a big fish really swallowed Jonah when she sincerely doubts the facts in the case? Should she say that a *special* fish was created for the occasion? Has she sufficient authority to state that the writer was speaking figuratively when he wrote the story of Jonah? What would you do?

1. Teach the story as literally true while believing it to be false?
2. Tell the story without interpreting it, but if pressed for an explanation, state your sincere beliefs concerning it?
3. Explain the story as pure fiction without any basis in fact?

One of the new novelists had been discussed in the high school English class. Marion Hayes was interested in the man and in the subjects about which he wrote. That evening at supper she chanced to mention the author's name and stated that she intended to read his latest book. Her father looked at her in surprise. Then he took great care to explain to her that although the work of this man was quite proper in itself, he, personally, was not in good standing with the authorities of their church. She asked, "Can't one read this man's books without being influenced by his character?" Her father replied that she must decide that question for herself, but that he felt that such a course was impossible. What would you have done?

1. Refused to read the man's books, and risked the contempt of your friends?
2. Read the books, knowing that your father and your church did not approve of your action?

4

Social Intelligence Test[1]

Four answers are suggested for each of the following questions. Make a check in the space in front of the answer which you consider to be most nearly correct. Do not check more than one answer. If you do, your work on that question will not be counted.

1. An acquaintance of yours has just lost a near relative: On meeting him at the club it would be best to:

.....Speak well of his departed relative.
.....Cheer him up with a lively story.
.....Tell him how you managed to bear up in similar circumstances.
.....Talk about current events of general interest.

2. You are visiting your country relatives whose table manners are not so polished as yours. You should:
.....Explain with tact the proper table manners.
.....Send them a book of etiquette as a Christmas present.
.....Do as they do.
.....Show as much refinement as you can without appearing conspicuous.

3. Harris, a young man of 24, spends a large proportion of his time and wastes considerable money on late parties, shows, and similar pleasures. His friends have warned him that he cannot

[1] MOSS, F. A., HUNT, T., OMWAKE, K. T., RONNING, M. M., *Social Intelligence Test.* Excerpts made by special permission of Center for Psychological Service, Washington, D. C.

succeed in his business career if he keeps it up. He will most likely change if:

.....The night life begins to affect his health.
.....His friends impress upon him that the harm is to himself.
.....His employer finds out and warns him.
.....He becomes interested in developing some phase of his work.

4. You have just moved into a new neighborhood and a neighbor who has called on you once invites you for an automobile ride. On the trip a stop for gasoline is made. It would be best for you to:

.....Offer to pay for the gasoline.
.....Insist on paying part of the charge.
.....At the end of the ride offer to pay part of the charge.
.....Say nothing about the charge.

5. You are working in an industrial firm. Your employer wants you to attend a course of trade lectures, but this interferes with outside classes you are attending at night school. It would be best to:

.....Attend the school classes and tell him of the conflict if he inquires.
.....Explain the situation to him and get his opinion of the relative importance of the two courses.
.....Drop the school classes in the interest of your work.
.....Attend one class one time and the other the next without any comment.

6. A young man invites a young lady to go to a show with him. On approaching the theater he discovers he has left his pocketbook at home. It would be best to:

.....Try to get tickets on credit by offering to leave his watch as security.
.....Try to find some friend from whom he can borrow money.

.....Decide with her on a course of action.
.....Find some plausible excuse and go home and get his money.

7. You wish to ask a favor of an acquaintance whom you do not know very well. The best way to ask him would be to:
.....Try to impress upon him that he is the one who will benefit.
.....Tell him how greatly he can benefit you if he does it.
.....Offer to do something for him in return.
.....Ask him, briefly stating your reasons.

8. Joe Hartley is a newcomer in a school where hazing is the custom. A crowd of the school leaders take him out to haze him. It would be best for him to:
.....Maintain his dignity at any cost.
.....Resist the hazers to show that he is game.
.....Treat the hazing as a joke.
.....Report the names of the hazers to the authorities.

9. A fellow employee loafs on the job so that you must do more than your share of the work. The best way to keep pleasant relations is to:
.....Explain the situation to your employer.
.....Courteously inform the other fellow that he must do his share of the work or you will tell the boss.
.....Do as much work as you can efficiently and say nothing about the other employee.
.....Do your share of the work and leave the rest undone if the other worker does not do it.

10. You are giving a dinner for eight people. After the invitations have been issued you learn that two of the individuals you have invited are bitter enemies, and you believe that bringing them together will result in an embarrassing situation. To save the situation it would be best to:

.....Allow the dinner to go on and try to keep the two guests apart.
.....Postpone the dinner and change the invitations.
.....On some plausible excuse withdraw the invitation of the most objectionable guest.
.....Notify each of the two enemies that the other is coming.

11. You have done a great many favors for a friend, until he begins to assume that you will manage all his little difficulties. The best way to readjust the situation without offending him would be to:
.....Explain to him the harm he is doing to himself.
.....Give him a plausible excuse for not granting him what he asks.
.....Confide the situation to a mutual friend who may be able to straighten things out.
.....Grant the next favor he asks, but in such a way that he will think it would have been better if he had not asked it.

5

Sociability[1]

1. Do you like people? ..... Yes No
2. Do you enjoy talking to people about what interests them? ..... Yes No
3. Do you have a keen sense of humor? ..... Yes No
4. Do you enjoy doing things for your friends? ..... Yes No
5. Are you a forceful, vigorous person? ..... Yes No
6. Do you let your friends do their fair share of talking? ..... Yes No
7. Are you courteous and thoughtful of little comforts of your friends? ..... Yes No
8. Do you have strong convictions? ..... Yes No
9. Do people listen attentively when you talk? ..... Yes No
10. Do your friends ask your advice? ..... Yes No

[1] Used by courtesy of Professor G. U. Cleeton.

11. When you talk with a person, do you listen attentively to what he is saying? ..... Yes No
12. Do you encourage your friends to talk by asking them questions? ..... Yes No
13. When you meet strangers, do you like to discover their interests by asking them questions? ..... Yes No
14. Do you consciously try to talk to people about what will interest them? ..... Yes No
15. Do you enjoy finding out what people are really like? ..... Yes No
16. Do you see the good points in your opponent's arguments? ..... Yes No
17. Do you ever change your mind in an argument? ... Yes No
18. Do experiences change your opinions? ..... Yes No
19. Are you able to see your opponent's side of an argument? ..... Yes No
20. In a family conference or business conference, do you approach the problem with a desire to get everybody's side of the question before you come to a decision? ..... Yes No
21. When you talk to people are you quick to pick up new ideas? ..... Yes No
22. In a group discussion do you listen sympathetically to all sides of the question? ..... Yes No
23. Do you praise people honestly and generously? .... Yes No
24. Do you take the part of friends who are being unfairly criticized? ..... Yes No
25. Do you like to entertain people and call on them? .. Yes No
26. Can you talk entertainingly? ..... Yes No
27. Do you carry on your share of a conversation? ..... Yes No
28. Are you able to relate the events of an experience interestingly? ..... Yes No
29. Do you remember anecdotes to be used to brighten your conversation? ..... Yes No
30. Are you able to talk intelligently about a large number of things? ..... Yes No

31. Are you able to find new words for different ideas? Yes No
32. Do you know and practice the manners of courteous people? ..... Yes No
33. Are you thoughtful of the feelings of others? ..... Yes No
34. Do you consciously try to make your guests happy? Yes No
35. Do you try to make your host enjoy your visit? .... Yes No
36. Are you as courteous to your family as you are to strangers? ..... Yes No
37. Do you think politeness pays? ..... Yes No
38. Do you excuse other people's faults? ..... Yes No
39. Do you frequently tell other people about the good points of some person? ..... Yes No
40. Are you easy to get acquainted with? ..... Yes No
41. Can you make people laugh by telling funny stories? ..... Yes No
42. Can you easily get the crowd to go the way you want them to go? ..... Yes No
43. Do you find it easy to strike up a conversation with a stranger? ..... Yes No
44. Do you enjoy trying to convince people about something? ..... Yes No
45. Can you talk to a person you dislike without letting him know about it? ..... Yes No
46. When you have disagreed with someone, can you adjust the difficulty and retain his friendship? .... Yes No
47. Do you enjoy hearing other people tell funny stories? ..... Yes No
48. Do you enjoy watching people in a crowd? ..... Yes No
49. Are you good at remembering people's names? .... Yes No
50. Can you repeat a funny story after hearing it only once? ..... Yes No
51. Are you critical of other people? ..... Yes No
52. Do the little personal habits of other people annoy you? ..... Yes No
53. Do you try to shift a conversation over to a subject in which you are interested? ..... Yes No

54. In a conversation do you do most of the talking? .. Yes No
55. Do you repeat the same amusing anecdote on several occasions? ..... Yes No
56. When you talk with a person are you usually waiting until he has finished so that you can say what is on your mind? ..... Yes No
57. Do you express your own ideas in order to start a conversation? ..... Yes No
58. Do you like to tell people about yourself? ..... Yes No
59. Do you talk about the same thing to everybody? ... Yes No
60. Does your chief joy come from your own plans and ideas? ..... Yes No
61. Do you like to tell strangers about yourself? ..... Yes No
62. Do you stubbornly defend your own ideas? ..... Yes No
63. Are you afraid to acknowledge that you may be wrong? ..... Yes No
64. Do you believe that people will think you are weak if you change your opinion? ..... Yes No
65. Do you defend your own ideas through thick and thin? ..... Yes No
66. Do you become irritated when people do not agree with you? ..... Yes No
67. Are you frequently bored with people? ..... Yes No
68. Do you frequently feel that there is nothing in what the other person says? ..... Yes No
69. Do you frequently believe that people are ignorant or conceited? ..... Yes No
70. Do other people believe that you are hard to convince? ..... Yes No
71. When a person differs from you do you think he is wrong? ..... Yes No
72. Do you frequently think a person does not know what he is talking about? ..... Yes No
73. In a conference with other people do you lay down the law and fight for it? ..... Yes No
74. Are you sparing in your praise of other people? .... Yes No

75. Do you speak of other people slightingly? ..... Yes No
76. Do you frequently say things of people you would not want them to hear? ..... Yes No
77. Do you believe in letting other people look out for themselves? ..... Yes No
78. Do you entertain people from a sense of duty? .... Yes No
79. Do you attend receptions because you feel you are under an obligation to do so? ..... Yes No
80. When you entertain other people, are you anxious to get it over with as quickly as possible? ..... Yes No
81. Are you always anxious to get away from social affairs? ..... Yes No
82. Are you neutral on most questions? ..... Yes No
83. Are you afraid to take a stand on the question because you think someone might prove you to be wrong? ..... Yes No
84. In a conversation do you let other people do practically all of the talking? ..... Yes No
85. Do you believe it is best to live up to the old adage "that still water runs deep"? ..... Yes No
86. Do you frequently find that you do not have many good ideas on a subject that is being discussed in a group? ..... Yes No
87. Do you frequently have trouble in finding the right word to express your feeling about a matter? ..... Yes No
88. Do you often repeat such catch phrases as "I'll tell the world"? ..... Yes No
89. Do you find the same word cropping out in your conversation quite frequently? ..... Yes No
90. Do you think it is possible to be friendly without being polite and courteous? ..... Yes No
91. Do you think good manners are usually artificial? .. Yes No
92. Do you feel awkward and embarrassed in a crowd? Yes No
93. Do you often invent excuses to get away from a social gathering early? ..... Yes No

94. Do you ever mail letters and regret that they were sent? ..... Yes No
95. Are you considered bashful? ..... Yes No
96. Are your feelings easily hurt? ..... Yes No
97. Do you limit your acquaintances to a select few? ... Yes No
98. Do you prefer to express yourself in writing rather than orally? ..... Yes No
99. Are you sensitive to remarks that people make about you? ..... Yes No
100. Do you frequently say what is right even if people think that you are tactless? ..... Yes No

II

THE THEORY AND PRACTICE OF TESTING

1. INTELLIGENCE TESTS

Plato, in the *Republic*, suggests that leaders of the state should be chosen according to their ability. "We shall cause the young men to do tasks in which they might forget or might be deceived," he writes, "and those who do not forget or are not deceived shall be chosen." In this statement over two thousand years ago we have the first essential of an intelligence test. It consists of a series of tasks which range in difficulty from easy to hard. The individual who can do more of these tasks, or harder ones, has the greater ability.

Intelligence tests test educability

Plato's statement does not, however, consider two great difficulties that exist in the measurement of ability. If, for example, one of the "tasks" is to compute interest, those who have been taught can succeed, while those who have not will fail. Obviously, if our tests are to be of any worth, they must minimize the factor of differences in instruction. The second difficulty is in knowing what accomplishment to ex-

pect. If a person fails on a given task is he dull, or is the task too hard? We can tell only by testing large numbers of people of various grades of ability and finding out what they can do.

Not until the present century were these difficulties solved, and practical use made of intelligence tests. The development of tests is due to the work of no single man. Wundt, in establishing the first psychological laboratory at Leipzig in 1878, was the first to measure extensively human behavior traits in quantitative terms. His work was carried further by James McKean Cattell, in the United States, in testing simple psychological functions such as reaction time, noting the average performance of groups, and the extent to which individuals varied. In 1904, Alfred Binet, in France, had the first opportunity for the practical use of tests. The school authorities of Paris, planning to segregate the mentally deficient pupils for separate instruction, wished to know which pupils were unsuccessful because of inferior mentality, and which because of lack of moral qualities or differences in training. Binet, who had been for years among the leaders in the psychological study of individual differences, devised a series of tests, and found by experiment that they successfully distinguished the dull from those otherwise retarded. To eliminate the effect of differences in schooling, the tasks were selected from the common environment. They tried, in general, the ingenuity of the child rather than what he had learned. The problem of how much to expect was handled very directly. Experiment showed that the average child of a given age could do so many of the tasks and no more. Those who did fewer than the average were inferior, the degree of

inferiority bearing an inverse relationship to the number of tasks done.

The idea of age standards was more highly developed in the revisions of the tests which Binet published in 1908 and 1911. He had found that certain separate tasks could be performed by, say, 20 per cent of six-year-olds, 65 per cent of seven-year-olds, and 85 per cent of eight-year-olds. The average seven-year-old could do this task, but not the average six-year-old, while the average eight-year-old child could do a harder task. This formed the concept of Mental Age. The child who could perform the ten-year, but not the eleven-year tasks, had a Mental Age of ten years, regardless of his chronological age. It was found that children of the same Mental Age were far more alike in their school abilities than those who had lived the same number of years.

The Binet tests have been revised in the languages of most of the countries of the world. An examination of some parts of the American revision, by Lewis Terman of Stanford University, will show the nature of the tasks. There are six tasks at the level of each year of Mental Age.

Year six

1. Right and left. Shows where his right hand, left ear, right eye, are (No error allowed)
3. Counts 13 pennies (One of two trials correct)

Year ten

2. Detects absurdities. Example: "An engineer said that the more cars he had on his train, the faster he could go. What is funny about that?" (Must explain 4 of 5 given statements correctly)
5. Comprehension. Example: "Why should we judge a person more by his actions than by his words?" (2 of 3 given statements correct)

Year twelve

2. Defining abstract words: Pity, Revenge, Charity, Envy, Justice (3 out of 5 correct to pass)
6. Repeating five digits *backward*. (1 of 3 given sets correct to pass)

The important features of these items are these:

1. The tasks are definite. If we are to compare children, they must be given exactly the same tasks.
2. The tasks depend very little on school learning.
3. The standards are definite and determined experimentally.

In Year Twelve. Test 2, the standard is three out of five words right, because that is what twelve-years-olds can do. Making the standard five of five correct might make the task a fourteen-year test instead of a twelve-year one.

Terman also introduced a new concept in intelligence testing, the Intelligence Quotient. (This had been suggested by Stern in Germany several years previously, but not used.) The Intelligence Quotient indicates the rate of growth of intelligence, and the degree to which an individual is above or below the average. The average twelve-year-old has twelve-year intelligence.

By the formula

$$\frac{\text{Mental Age}}{\text{Age}} = \text{Intelligence Quotient},$$

his I.Q. is 12/12, or 1.00, commonly written as "100." One hundred is thus the "normal" or average Intelligence Quotient. A feeble-minded child of twelve years, whose mentality has reached only the six-year level, would have an I.Q. of $6/12 = 50$. An above-average twelve-year-old who tests

fifteen years on the tests, has an I.Q of 15/12 = 125. The interpretation of Intelligence Quotients is usually made as follows:

I.Q.		Per cent of population in this class
Below 70	Feeble-minded	1
70-80	Borderline	5
80-90	Dull normal	14
90-100	Normal	60
110-120	Superior	14
120-130	Very superior	5
Above 130	"Gifted"	1

The great shortcoming of the Binet tests is the amount of labor necessary to administer them. To test one child takes the exclusive time of a trained worker for one hour or more. To meet this difficulty, group tests have been devised, the tasks being stated and answered with pencil and paper, allowing the testing of large numbers at one sitting. Group tests contain such items as these:

Underline the correct answers:

1. One number is wrong in this series. Which one?
   1 5 2 6 3 7 4 9 5 9
2. The words superfluous and requisite mean:
   same opposite neither same nor opposite
3. Evolution is to revolution as crawl is to
   baby floor stand run knees
4. Write the letter of the alphabet which is the third to the right of the letter which is midway between M and Q.....

The preparation of a group Intelligence Test differs somewhat from that of the individual, or Binet, test, but it is similar in being an experimental process.

1. A large number of short tasks are formulated by the test maker.

2. These are tried out on a great many individuals, concerning whose abilities other information is available. This may be the results of a Binet test, or a record of school advancement, or the estimates of competent observers who have known the individuals for a long time. Against this criterion, every item of the proposed group test is checked. The items whose results correspond well with the criterion are kept; those whose results do not are thrown out. In no case is an item included because anyone "thinks it is a good test of intelligence." The items are included because they *do* show results that check.

3. The standards on the final form of the test are now determined. The "norm" for twelve-year-olds is the average number of points which twelve-year-olds score. For such groups as college freshmen, in which age is not an important factor, the Mental Age concept is replaced by one of Percentile Rank. A student having a "Percentile Rank of 95" has made a score on the test exceeded by only 5 per cent of his group. A "Percentile Rank of 50" is the average score. In no case are standards determined by what anyone thinks they should be. They are determined by the performance of the group in question.

One fault of both the Binet and ordinary group tests is very evident. They depend so much on language that the deaf, the illiterate and the foreign-language-speaking cannot be satisfactorily measured. For these persons special measures, called performance tests, have been devised. They are tests in which the instructions may be given by signs and

gestures, and the responses made by moving blocks, making X's on pictures, and similar non-verbal performances.

The most weighty proof of the validity of intelligence tests is that their scores correspond rather closely to other accepted measures of ability, and that they will predict, within limits, the future performance of an individual. This relationship is most evident in school situations.

If pupils entering the first grade are divided into three groups: the dull, the average, and the superior, by means of intelligence tests, this division is found to correspond to subsequent progress. The superior group is frequently able to complete two terms' work in one, while the dull group may take three terms to complete a year's course of study. By knowing this in advance, more efficient instruction may be arranged. The dull are not discouraged or mystified by the work intended for the bright, and the superior children are not held at a level of mediocrity. Among college students the same condition holds, though the relationship between intelligence scores and college marks is not so high. In one institution, however, it is found that the chances that students who receive the highest rating on a freshman intelligence test will be average or above in scholarship are 5 to 1. The chances *against* those receiving the lowest rating being as good as average are 10 to 1.

In 1918, the Army Alpha, the first widely used group test, was employed in testing 1,726,966 men in the United States military services. The most striking result was the relationship between the scores and occupational status. Those who had been professional men scored highest, the clerical occupations next, then skilled laborers, and unskilled laborers lowest. Although there was considerable overlapping of scores

between groups, and although part of the differences are undoubtedly due to differences in training, there seems to be a decided tendency for those of greater natural ability to enter the more intellectually demanding occupations. A survey of college students shows a similar result. Not one per cent of them fell below the average of the drafted men in the army, while half of them made scores exceeded by only four per cent of the larger group. Evidently, college students are quite highly selected for general mental ability.

On the other hand, the relationship between intelligence and traits commonly ascribed to character, temperament and personality is far less exact. Investigations have shown a certain amount of positive relationship in comparing groups of various mental levels. The average of children who test above 140 I.Q. has been found to excel the average of "normal" children in honesty, popularity with playmates, and athletic ability. At the other end of the scale, the average of intelligence scores of convicts in prisons has been found to be low. There is much overlapping between groups, however, for in spite of these "average" findings, some of the bright are deficient in character and personality traits, and some of the intellectually dull rank high. The trait of leadership has some relationship to intelligence. Certainly the leaders of a group are above its average in intelligence, but those most above the average are not necessarily the leaders. In all these traits, qualities other than intelligence, of which we have as yet less reliable measures, are important determining factors.

2. APTITUDE TESTS

An aptitude test is a test of potential ability, or a test that indicates what a person is liable to accomplish in a certain

line of activity, given adequate training. Its purpose is to ascertain the mental interests and sensory and motor capacities that fit a person for some one particular vocational pursuit. Its ideal is well expressed in the words of L. P. Jacks:

Aptitude tests indicate special talent

In the first place, it will be said that the true aim of education is not the excellence of the work done, but the excellence of the man who does it. To which the answer is that so long as man remains a worker—and there are reasons for believing that as time goes on he will become more of a worker and not less—the only pathway to his excellence as a man lies through the excellence of the work he is doing. Of all factors and forces that make a human being what he is, for good or ill, by far the most important, the most vitally influential on his mind and character, is the daily work of his vocation—whatever that may be, from shoveling coals into a furnace to presiding over the High Court of Justice. If a man gets no culture out of his daily work, out of his vocation, he will get precious little out of anything else.[1]

As an illustration of an aptitude test, we shall take musical talents, tests for which have been thoroughly standardized and well established as to reliability.

To devise the tests it was necessary to find out what musical talent consisted in. This was derived from three sources. The first source was an examination of what great teachers had to say about the powers one must possess in order to attain any degree of artistic performance. Thus, Professor Leopold Auer, the great teacher of such artists as Elman, Zimbalist and Heifetz, writes:

One great mistake lies in the failure of so large a majority of those who decide to devote themselves to music—to learning some string instrument, the violin, for example—to ascertain at the very outset whether nature has adequately supplied them with

[1] *Responsibility and Culture*, Yale University Press, 1924, pp. 58-59.

the necessary tools for what they have in mind. They apparently do not stop to consider that for a student to devote himself to the mastery of the violin with no more than a vague and uncertain idea of prerequisite conditions is tantamount to inviting failure.

The second source was an experimental investigation of the special powers possessed by musical prodigies. The third source was the comments of great artists concerning their own performance.

From the evidences obtained from these sources it was found that talent for music is not a single power or capacity, but consists of several groups of talents, each group performing a specific and definite function in the making of the artist. In other words, when the musician works his miracles in his audience through the medium of his voice or instrument, he is exercising not one single power possessed by him, but a hierarchy or cluster of powers, all functioning together to produce the single result.

Musical talent as a whole, then, consists of scores of individual, elemental, specific capacities, each contributing its share to the making of the artist as a whole. These specific talents which constitute talent as a whole are summarized under three heads, namely, Acoustic Sensitivity, Musical Sensitivity, and Musical Virtuosity, forming the sensory, the æsthetic and the motor bases of musical artistry. This means that an artistic rendition of a musical composition of standard value is conditioned upon, rests upon, the intensity with which the artist experiences its effective content; his intellectual grasp of the composition in content and structure, the sensitivity of his ear in such matters as intonation, timbre, and dynamics, and finally, upon his technical equipment, by means of which the other factors of musical interpretation

are enabled to function. Where there is no technique there is no art; but where there is no feeling and understanding, that is, musicianship in general, technique is but an empty shell. Thus, it is only when the affective, the intellectual, the sensory and the motor equipments exist to a marked and somewhat uniform degree in the same person that artistic perfection is possible.

Finally, talent for music is a gift bestowed by nature upon different persons very unequally. In the first place, we have the extremes of very marked talent, of the musical genius, on the one hand, and no talent at all on the other, and all the degrees of talent between these two extremes. Then again, there is the person who possesses all the prerequisites of musical talent, namely, musical sensitivity, musical feeling, musical understanding, or, in other words, who is equipped by nature with the sensory, the affective and the intellectual basis of talent, but lacks the fourth prerequisite, musical virtuosity, that is, the motor or technical basis of musical production. Again, we find the reverse of this condition in the person who possesses a marked motor equipment and can attain marked technical proficiency, but who is lacking in one or all of the other three capacities. This is the person who would express himself adequately through some musical medium, but who has little or nothing to express. It is but rarely that we find an individual equally gifted, and to a high degree, with all the capacities that function in an artistic performance, a fact supported by the scarcity of shining lights in the firmament of music.

The next step was to make an inventory of the specific powers that operate in musical artistry, and to devise a test

for each of the powers. The inventory is divided into acoustic sensitivity, musical sensitivity, and musical virtuosity.

The potential musical artist must be keenly sensitive to minute variations in matters of pitch, intensity, duration and consonance. Without a keen ear for these factors, his performance may be faulty in such vital artistic effects as perfect intonation, a singing tone, a tone of varied dynamic contrasts, or intensity inflections, and a fine rhythmic balance and symmetry. The specific factors on auditory sensitivity, then, for which tests have been devised, and for which the prospective musical artist should be tested, are as follows: (a) pitch discrimination; (b) consonance discrimination; (c) intensity discrimination; (d) time discrimination. These four items form the very basis of musical talent. Where there is no keen acoustic sensitivity to these four attributes of tone which constitute the basic material of music, any degree of artistic musical performance is impossible.

Acoustic sensitivity

Under this general heading of musical sensitivity function the following specific musical items: absolute pitch, relative pitch, tonal memory, tonal sequence, and rhythm. These factors underlie the general musicianship of the person. A person's response to these items is an indication of the degree of his æsthetic sensitivity to the material of music, both melodic and harmonic.

Musical sensitivity

The factors thus far mentioned indicate the musical constitution of the mind as a whole. The powers tested form the basic conditions in the making of a musical artist, for they determine whether the prospective performer possesses to the required degree the essential sensory and æsthetic equipment which will enable him to have something to say through the medium of his instrument or voice. But one most essen-

Musical virtuosity

tial general factor functioning in musical artistry still remains: granted that the individual possesses the musical capacities already enumerated to a marked degree, does he also possess natively the muscular equipment which will enable the musical mind to express itself articulately? Musical expression is conditioned basically upon adequate technical equipment, for where there is no technique, there can be no art. Technique is largely a matter of native muscular equipment. It has been established experimentally that not only are there measurable differences between the reactions of the several fingers in speed and accuracy for the same person, but that there are very marked individual differences, so that there are persons who with unlimited practice can never attain the speed nor the accuracy which others show at the very beginning. Motor capacities on which technique is based remain fairly constant into old age under normal conditions.

The tests are as follows:

Tests of Acoustic Sensitivity[1]

Pitch discrimination
Intensity discrimination
Time discrimination
Consonance discrimination

These tests measure the keenness of the ear in matters of pitch, intensity, duration and consonance. They answer the following questions:

1. What is the smallest difference in the *pitch* of two tones to which the ear is sensitive?

[1] These tests were devised by Dr. Carl E. Seashore and are recorded on phonograph disks.

2. What is the smallest difference in the *intensity* of two tones to which the ear is sensitive?
3. What is the smallest difference in the *duration* of two tones to which the ear is sensitive?
4. What is the smallest difference in the *consonance* of two tones to which the ear is sensitive?

Tests of Musical Sensitivity[1]

Absolute pitch — Tonal memory — Tonal sequence
Relative pitch — Rhythm

These are tests of general musicianship. The person's ranking in these tests indicates as a whole the degree of his æsthetic response to the structural material of music. The specific problem with which these tests are concerned is the following: Granted that a person possesses the acoustic bases for effective musical expression, is his emotional and intellectual reaction to music of such a type as to indicate that he also has something to express?

3. CHARACTER TESTS

A character test seeks to establish one's standing in the traits of personality

A character test, as the word indicates, seeks to measure one's standing in some one or more traits or characteristics of behavior of the integrated personality. Since we judge others by our conduct and others judge us by our conduct, and since conduct is the outer manifestation of one's sentiments, disposition, temperament, prejudices, outlooks, beliefs, ambitions, hopes, fears, vanities, motives and purposes, our standing in these traits is an indication of how and why we conduct ourselves in a certain manner in the variety of conditions and circumstances of social interrelationship. A common

[1] These tests, with the exception of the one on tonal memory which is a Seashore test, were devised by the author.

complaint of people is that they are being misunderstood and misjudged. The truth of the matter is, most probably, that they misunderstand and misjudge themselves, for if self-knowledge is the virtue of virtues, it is also a virtue most difficult to attain. Tell a person he is prejudiced or narrow-minded and you insult him; and the more prejudiced he is, the greater will be his resentment when called such. He wants to believe that he is fair and broad-minded, and he sees himself as he would like to be rather than as he actually is. It makes a much more pleasant picture. He is really not a hypocrite, he is just ignorant. And so are all of us in a greater or less degree, when it comes to recognizing our true state of being. For instance, all of us are, of course, open-minded since we want to be so. But try the following experiment on yourself:

According to my first feeling reactions I should willingly admit members of each nationality (as a class, and not the best I have known, nor the worst members) to one or more of the relationships under which I have placed a cross (X). (Top of page 474.)

(If you are wholly unfamiliar with any one of the groups, you need make no marks for it. Note that crosses may be put in any number of the six columns.)

You have probably excluded one or more of the nationalities from your social circle. And you are quite certain that your attitude is based on perfectly sound, unprejudiced grounds. But let us see. The following test has been given to one thousand persons who were also sincere and honest in their likes and dislikes.

Directions: A. Read through the words and phrases listed on the following page. Consider each one not more than five seconds. If it calls up a disagreeable association, cross it out. You may cross out

	1 To citizenship in the United States	2 To my church as full members	3 To the street where I live as neighbors	4 To my employment as fellow workers	5 To my home as personal chums	6 To close kinship by marriage
Belgians						
British						
Chinese						
Czechs						
French						
Germans						
Italians						
Japanese						
Mexicans						
Poles						
Russians						

many or few words. Work as rapidly as you can, but be sure you cross out every word which is more annoying than pleasing, more antagonizing than appealing, more distasteful than attractive.

1. Nordic
2. Disarmament
3. Jew
4. Prince of Wales
5. Immigrant
6. Protestant
7. Pole
8. World Court
9. Ku Klux Klan
10. My Country Right or Wrong
11. Roman Catholic
12. 100 per cent American
13. Mohammedan
14. Socialist
15. Nationalism
16. Propaganda
17. America First
18. American Legion
19. Made in Germany
20. Pacifist
21. Monroe Doctrine
22. Defense Day
23. Foreigner

24. League of Nations
25. Japanese
26. Chinese
27. Reserve Officers' Training Corps
28. Quaker
29. West Point
30. Radical
31. Non-resistance
32. Independence of Philippines
33. Treaty of Versailles
34. War Veterans
35. National Security League
36. Protective Tariff
37. Turk
38. Armenian
39. Slav
40. Mexican
41. Fascisti
42. Russian
43. French
44. Italian
45. Greek Catholic
46. Irish
47. Mussolini
48. Preparedness
49. German
50. Patriot

B. Now read through the list again, placing a cross opposite each word which calls up a pleasant association.

An inquiry into the causes of their attitudes revealed some significant facts, showing that whereas we want to be fair, we are not necessarily what we want to be. For instance, one woman did not like Catholics. Why?

"When I was a little girl," she wrote, "just starting to school, someone told me that in all the Catholic churches the Catholics kept weapons and ammunition in the basements, all ready at the slightest provocation to make war on the Protestants and kill them. The same person told me that she knew a Catholic lady who had said that she could wade in Protestants' blood up to her knees with a smile on her face. I have had Catholic girl friends since then, some of the best friends I have ever known, but I could never get rid of my first impressions."

Another disliked Jews.

"My early childhood," this confession began, "was spent in a suburban district of the city of Chicago, and in this place there lived but one family of Jews. This family consisted of Mr. and

Mrs. B, and their son Henry. As we were neighbors, Henry and I used to play together until one fatal day. While playing house I happened to break one of Mrs. B's white milk pitchers, for which Henry admonished me and frightened me terribly. . . . From that day I never played with Henry again, for I both hated him and at the same time was afraid of him. . . . Since my childhood days I have had many pleasant dealings with Jews and Jewesses. Yet when one mentions the name 'Jew' I am liable to grow very angry or condemn the Jewish race in a terrible manner, for then . . . the recollection of my childhood experience comes to mind."

Here is another illustration showing how honest we are with ourselves on most occasions. A group of twenty-three persons was asked to vote for or against the word "foreigner," namely, whether it had a pleasant or unpleasant effect. The result showed the group to be quite fair-minded to foreigners.

Since the discussion was being held in a town where there were many foreign-born people, the members were naturally interested to know what the vote would be on the Jews and on the Poles, who were very numerous in the city. To this list they added "Slav" for comparison with "Pole"; and "immigrant" to check with "foreigner." Since nearly all Poles are of the Roman Catholic faith, they added "Roman Catholic" to their growing list. Finally, noticing that all of these words were associated with people living in their home town, they added "Mexican" to get a sample vote on one important type of immigrant of whom they had seen little at first hand.

Their score on the blackboard looked like this:

Word	*Unpleasant*	*Pleasant*
Foreigner	5	5
Immigrant	1	7
Jew	4	11
Pole	5	5
Roman Catholic	5	5
Slav	5	2
Mexican	14	1

The first thing they noticed was that, with the exception of "Mexican," all the words revealed a pretty high degree of open-mindedness. Just to see if all words might not show the same tendency, the leader called for a show of hands to indicate the "unpleasant" reactions to "Bolshevik." All 23 hands went up! Similarly, at the mention of the word "Turk," 17 hands went up; and at "Mohammedan," 16.

A question as to why 7 of the group had a "pleasant" reaction to the word "immigrant" brought out the fact that a majority of the 23 were taking a course on "Immigrant Backgrounds," which was very popular. In this course special attention was being paid to the Jews and to the Poles. Following this clue a bit further, the leader learned that the study of the Jewish background had been made so interesting that it was the most popular section of the whole course. That accounted for the 11 "pleasant" votes on the word "Jew." It was interesting to note that "Roman Catholic" was apparently associated closely with "Pole," getting the same number of votes. As for "Mexican," a number of the group explained that they had not studied anything about Mexicans in their course; and never having seen any of them, had merely recorded the impressions they had picked up at the movies.[1]

Taken as a whole, our judgments of politics, religion, and moral and national matters are seldom fair and are most often based on prejudices, rationalizations, partial or superficial evidences. We seldom judge an issue on its own merits, considering the pros and cons, but in keeping with our own interests and particular beliefs. We do not begin with the facts and draw conclusions, but begin with the conclusion and marshal the facts to suit our purpose, so that, whereas each person is right from his standpoint, the standpoint is often wrong. The English philosopher, John Locke, puts the matter neatly in the following words:

[1] "What Makes Up My Mind on International Questions," *The Inquiry*, New York, 1926.

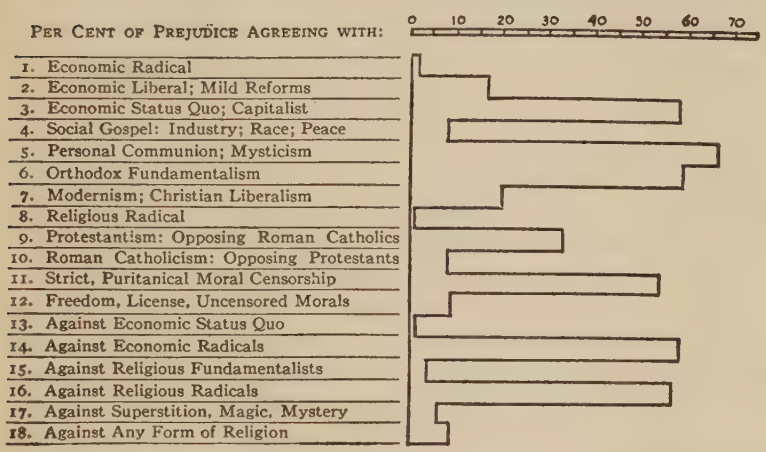
That which is inconsistent with our principles is so far from passing for probable with us that it will not be allowed possible. The reference borne to these principles is so great, and their authority so paramount to all other, that the testimony, not only of other men, but the evidence of our own senses are often rejected, when they offer to vouch anything contrary *to these established rules*. . . . There is nothing more ordinary than children receiving into their minds propositions . . . from their parents, nurses, or those about them, which, being insinuated into their unwary as well as unbiased understandings and fastened by degrees, are at last (and this whether true or false) riveted there by long custom and education, beyond all possibility of being pulled out again. For men, when they are grown up, reflecting upon their opinions and finding those of this sort to be as ancient in their minds as their very memories, not having observed their early insinuation, nor by what means they got them, they are apt to reverence them as sacred things, and not to suffer them to be profaned, touched or questioned.[1]

We are very prone, as Mark Twain once put it picturesquely, to build and roof a shed which we call Truth, and spend the rest of our lives keeping the roof in repair to prevent new facts from coming inside, thus saving us the trouble of thinking and the pain of changing our minds. Even Darwin confessed that it was easier for him to give weight to facts that supported his theories than to those that did not. But he was safe, since he was fully conscious of his prejudice. But most of us are not aware of our biases. Hence the value of the character test as a device for revealing ourselves to ourselves. Under ordinary conditions we are too engrossed in our own affairs, too occupied with the business

[1] Quoted by WATSON, GOODWIN B., *The Measurement of Fair-Mindedness*, Teachers College, Columbia University, p. 20.

of living and getting along, to see ourselves objectively in a disinterested manner. A character test catches us off our guard. It objectifies us by enumerating several traits which all persons possess in various degrees, and asking us to make an attempt to recognize ourselves among others. In the matter of prejudices, for instance, we hardly realize how prejudiced we are, or what our prejudices are, without the aid of some yardstick that shows where and how we stand as compared with others. The following profiles are examples of results obtained from a character test on fair-mindedness.

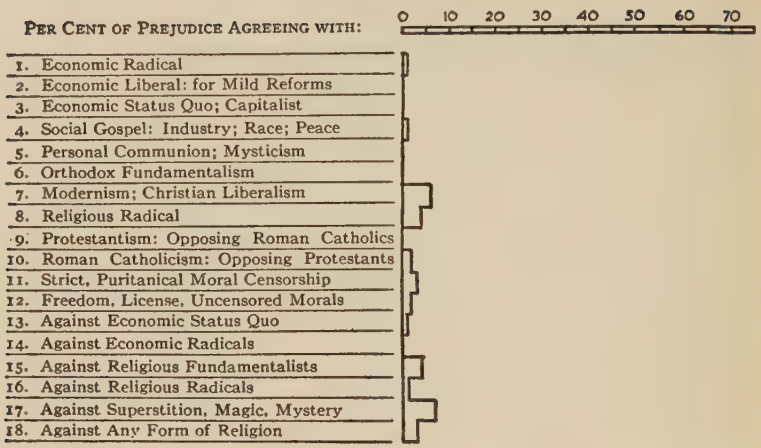
Profile I[1]


PER CENT OF PREJUDICE AGREEING WITH:
0 10 20 30 40 50 60 70
1. Economic Radical
2. Economic Liberal; Mild Reforms
3. Economic Status Quo; Capitalist
4. Social Gospel: Industry; Race; Peace
5. Personal Communion; Mysticism
6. Orthodox Fundamentalism
7. Modernism; Christian Liberalism
8. Religious Radical
9. Protestantism: Opposing Roman Catholics
10. Roman Catholicism: Opposing Protestants
11. Strict, Puritanical Moral Censorship
12. Freedom, License, Uncensored Morals
13. Against Economic Status Quo
14. Against Economic Radicals
15. Against Religious Fundamentalists
16. Against Religious Radicals
17. Against Superstition, Magic, Mystery
18. Against Any Form of Religion

This is a profile of a man of marked prejudices. Here he can see himself objectively as he actually is. An acquaintance calls him "one of the most prejudiced individuals I have ever known. He is so much of a fundamentalist that he gleefully condemns to the nethermost hell any person who suggests that heaven is not up above the clouds, a real, existing place."

[1] *Ibid.*, pp. 53 and 62.

Profile II


PER CENT OF PREJUDICE AGREEING WITH:
0 10 20 30 40 50 60 70
1. Economic Radical
2. Economic Liberal: for Mild Reforms
3. Economic Status Quo; Capitalist
4. Social Gospel: Industry; Race; Peace
5. Personal Communion; Mysticism
6. Orthodox Fundamentalism
7. Modernism; Christian Liberalism
8. Religious Radical
9. Protestantism: Opposing Roman Catholics
10. Roman Catholicism: Opposing Protestants
11. Strict, Puritanical Moral Censorship
12. Freedom, License, Uncensored Morals
13. Against Economic Status Quo
14. Against Economic Radicals
15. Against Religious Fundamentalists
16. Against Religious Radicals
17. Against Superstition, Magic, Mystery
18. Against Any Form of Religion

This is a profile of a woman unusually free from prejudices. She writes:

Eight years of comparative leisure in a cosmopolitan city, abroad, gave me the advantage of a wide variety of friends of different races, classes, beliefs, and interests, from every part of the world. The complexity of social conditions and the genuineness of widely diverse points of view came home to me vividly.

With such a nature, schooling, and experience, is it strange that I should reserve decision, reconsider all kinds of arguments, and make all possible allowances, in such a way as to give me a low score on this test? The "All" or "No" response is utterly foreign to me. Whatever my own opinions, such matters are phenomena for study rather than causes for action on my part; the behavior of persons concerned is to me a matter for interpretation rather than simple praise or blame, for study into sources and the enormous complexity of social causes and results.

. . . . .

We thus close our study of human nature, as we logically should, with the foregoing discussion of the efforts being

made by psychologists to devise some reliable means for measuring the human personality. It is only after the constituent traits of personality have been analyzed out, as we have tried to do in this book, that a need arises for a scale that will indicate the degree in which these traits are present in different individuals and how they operate, that is, what effects they produce on the personality as a whole. This is one of the tasks that the psychologist is coping with today. We may expect that, when the reliability of such measures has been fairly well established, the ideal of the science of psychology to control human nature will approach realization, in that we shall be able to obtain enough data upon which to base a dependable prediction as to the results that will follow a given human situation.

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